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FINAL SOIL AND GROUNDWATER MANAGEMENT PLAN

369 Washington Street
Woburn, Massachusetts

Prepared for Madison Woburn Holdings, LLC
File No. 3706.00
April 201ω

1 Technology Park Drive
Westford, MA 01886

Mr. Joseph F. LeMay, P.E.
Office of Site Remediation & Restoration
USEPA Region 1
5 Post Office Square Suite 100
Boston, MA 02109-3912

April 24, 2015
File No. 3706.00

Re: Final Soil and Groundwater Management Plan
Woburn Landing
369 Washington Street
Woburn, Massachusetts

Dear Mr. LeMay,

On behalf of Madison Woburn Holdings, LLC, Sanborn, Head & Associates, Inc. (Sanborn Head) is pleased to submit the Final Soil and Groundwater Management Plan for the property located at 369 Washington Street in Woburn, Massachusetts.

Please call us at 978-392-0900 with any questions you may have.

Very truly yours,
SANBORN, HEAD & ASSOCIATES, INC.

Patricia M. Pinto, P.E., LSP
Senior Associate/Vice President

Vernon R. Kokosa, P.E.
Principal/Senior Vice President

KBW/PMP: kbw

Encl. Final Soil and Groundwater Management Plan

cc: Denis Dowdle, Madison Woburn Holdings, LLC
Clayton Smith, de maximis, inc.
John Guswa, JG Environmental
Anne Sheehan, Tetra Tech
Dave Crawford, Crawford Drilling
Jennifer McWeeney, MassDEP
David Sullivan, TRC
Jeff Saunders, TRC

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1.0 INTRODUCTION

Sanborn, Head & Associates, Inc. (Sanborn Head) has prepared this Final Soil and Groundwater Management Plan on behalf of Madison Woburn Holdings, LLC (Madison) for management of soil and water encountered during the planned redevelopment of the W. R. Grace & Co.-Conn. (W. R. Grace) property located at 369 Washington Street in Woburn, Massachusetts (Site). This Soil and Groundwater Management Plan describes procedures to be followed for the management of soil and groundwater encountered during the planned redevelopment of the Site, as well as the air and dust monitoring program to be followed during construction. In addition, this plan outlines the procedures to be followed if a previously unknown area of contamination is encountered during earthwork at the Site.

2.0 SITE HISTORY

The Site was formerly used by W.R. Grace for manufacturing and distributing stainless steel equipment. Manufacturing operations occurred on-Site between 1960 and 1987. Prior to the purchase of the property by W.R. Grace, the property was farmland. In the late 1970s, the Environmental Protection Agency (EPA) began investigations related to contaminated groundwater in two municipal water wells located to the southwest of the Site. The Site was identified by the EPA as one of several source areas for volatile organic compound (VOC) contaminated groundwater in the Wells G&H Superfund Site.

A 1989 Record of Decision (ROD) for the Wells G&H Superfund Site required the implementation of a groundwater remedy at the Site. A groundwater extraction and treatment system was installed and began operation in 1992, which included the treatment building currently located on the southeastern portion of the Site. The extraction and treatment system remediates VOC-contaminated groundwater in the shallow bedrock and unconsolidated deposits on Site. A deep bedrock extraction well located on the nearby UniFirst property collects groundwater in deeper bedrock under the Site.

The contaminants of concern at the Site as specified in the ROD include: trichloroethene (TCE), total 1-2,-dichloroethene (total-1,2-DCE), tetrachloroethene (PCE), vinyl chloride (VC), 1,1-dichloroethene (1,1-DCE), chloroform, and 1,2-dichloroethane (1,2-DCA). In addition to VOCs, polycyclic aromatic hydrocarbons (PAHs) and polychlorinated biphenyls (PCBs) have also been detected in Site soil.

A large manufacturing building and warehouse occupied by W.R. Grace at the Site was demolished in 2006. During building demolition, the drain/utility lines, floor slab, foundations, and footings of the former manufacturing building and warehouse were removed. Test pits and soil borings were advanced as part of an investigation program that targeted the drain lines, the drainage swale and other features that became more easily accessible once the buildings were demolished.

Visual observations and a multi-stage field-screening procedure were used to evaluate soil that was excavated. The multi-stage process included standard field photoionization detector (PID) jar head-space screening on 220 soil samples, as well as use of EPA Method 3815 Field Screening for detecting the possible presence of contamination in the form of a non-aqueous phase liquid (NAPL) on 25 samples. Field head-space screening values were less than 10 ppmv for more than 210 of the samples, and no field PID jar head-space reading exceeded 100 ppmv. No Method 3815 Field Screening results exceeded the conservative NAPL-screening threshold concentration of 5,000 mg/kg. In addition to the field-screening procedures, 52 samples were collected for VOC analyses and 21 samples were collected for PCB analyses. VOCs were not detected at concentrations above ROD-specified action levels in the 52 samples analyzed. The PCB Aroclor 1254 was detected in two of the 21 samples analyzed for PCBs. These two samples were located under a former floor drain at a depth of two feet below ground surface. This soil was removed as part of response actions performed in 2012. PAH-impacted soil was also removed from the south drainage ditch in 2012. In the September 2014 Five-Year Review Report for the Wells G&H Superfund Site, EPA wrote that "the excavation activities completed at the Grace property in 2012 successfully removed soil exhibiting contaminant concentrations in excess of ROD action levels and no further action to address on-property soils is currently required. Grace documented their work in their *Soil Response Action Completion Report, Revision 1* (Tetra Tech and JG Environmental, 2013a), which was accepted by EPA on June 5, 2013."

3.0 ANTICIPATED CONDITIONS

Subsurface conditions at the Site generally consist of till overlying bedrock. In areas that were beneath former buildings a sand fill overlies the till. At the surface, the Site generally consists of reworked till. Based on borings that were advanced in the area of the former main building and warehouse, the sand fill is expected to range in thickness from approximately 3 to 10 feet. Bedrock is located at a depth of approximately 20 feet across the Site.

The depth to groundwater ranges between approximately 4 and 58 feet below the ground surface. Water levels are influenced by the groundwater extraction and treatment system operating at the Site. Groundwater is generally shallower on the eastern portion of the Site, toward the wetlands, and deeper in the southwestern corner of the Site.

The maximum detected concentrations of TCE and PCE in groundwater at the Site in 2014 were 61 µg/L and 12 µg/L, respectively, which are above the applicable Maximum Concentration Levels (MCLs) of 5 µg/L for both compounds. The elevated concentrations of TCE in groundwater are generally located in the northern and central portions of the Site, and the elevated PCE concentrations, which are believed to be derived from an off-property source, are generally located in the southwestern corner of the Site. Elevated TCE concentrations in groundwater are also located along the south central portion of the Site near the east end of the Area 3 Recovery Wells.

4.0 PROPOSED REDEVELOPMENT PLAN

The proposed redevelopment plan for the Site includes the construction of three restaurant buildings and a hotel. The buildings will be of slab-on-grade construction. Sub-slab depressurization systems will be installed beneath each of the newly-constructed buildings. The proposed locations of these buildings are shown on Figure 1.

The redevelopment plan is designed to result in a net import of soil, and soil that is removed from the ground during initial earthwork will be reused as compacted fill on the Site. The plan is also designed to limit the need to encounter and manage groundwater. Earthwork at the Site will involve excavation for building footings, foundation elements and utilities. Excavations are likely to be conducted in bare ground or grass-covered areas for building construction. A geotechnical drilling program will be performed as part of the design process for these buildings. Madison Properties, Sanborn Head and/or the Contractors will notify EPA, MassDEP and W.R. Grace of the schedule for all development intrusive work and vapor intrusion mitigation for each building on the Site, as further described in Section 12.0. EPA, MassDEP, and W.R. Grace will also be notified of modifications to the schedule, and will be provided with weekly construction schedule updates via email.

5.0 CONTACTS

The following section identifies key organizations and personnel responsible for work being performed under this Soil and Groundwater Management Plan. The table below summarizes the key organizations, personnel and their contact information:

Organization	Key Personnel	Contact Information
For W. R. Grace & Co.-Conn. (de maximis, inc)	Clayton Smith	(781) 642-8775 csmith@demaximis.com
Madison Woburn Holdings, LLC	Denis Dowdle	(617) 948-2525 dpdowdle@earthlink.net
JG Environmental	John H. Guswa	(978) 266-2992 jguswa@jgenvironmental.com
Tetra Tech	Anne Sheehan	(617) 320-9874 Anne.Sheehan@tetratech.com
Sanborn Head	Patricia M. Pinto	(978) 577-1012 ppinto@sanbornhead.com
Contractor – TBD	-	-
Driller – Crawford Drilling Services, LLC 25 Theodore Road Westminster MA, 01473	Dave Crawford	(978) 874-0830 office (978) 401-5765 cell dcrawford@crawforddrillingservices.com
EPA	Joseph LeMay	(617) 918-1323 Lemay.joe@epa.gov
MassDEP	Jennifer McWeeney	(617) 654-6560 Jennifer.McWeeney@state.ma.us
TRC Companies, Inc. (TRC)	David Sullivan, LSP Jeff Saunders, PG	(978) 970-5600 dsullivan@trcsolutions.com jsaunders@trcsolutions.com

6.0 SOIL MANAGEMENT

6.1 Excavation Requirements

As described previously, the redevelopment plan is designed to result in a net import of soil to the Site. Soil that is removed from the ground during initial earthwork will be reused as compacted fill on the Site. Sanborn Head will visually observe the soil excavation activities. If visual, olfactory, or ambient air monitoring instrument evidence of contamination is identified, the soil will be field screened with a PID in accordance with the procedure provided in Appendix A.

Excavated soil with a PID jar headspace screening result of 10 ppmv or higher shall be defined as “Potentially Contaminated Soil” and placed in a separate lined stockpile for further analysis for the presence of contaminants of concern in the ROD. Potentially Contaminated Soil that is found, after laboratory analysis, to contain contaminants of concern at concentrations above the ROD cleanup levels shall be defined as “Significantly Contaminated Soil”.

If Potentially Contaminated Soil has been segregated and stockpiled based on an exceedance of the field screening criteria, and subsequent sampling and laboratory analysis demonstrates that no contaminants of concern are detected at concentrations above the ROD cleanup levels, then the Potentially Contaminated Soil may be reused as compacted fill at the site, pending EPA approval. The field screening and laboratory data that support reuse of Potentially Contaminated Soil on-Site must be submitted to EPA for review and approval prior to reuse.

The proposed field screening threshold of 10 ppmv is a conservative estimator for evaluating the possible presence of VOCs. Historical records indicate TCE solvent was used to clean equipment, and as such, contamination present in soil would most likely be TCE, and associated degradation products from solvent releases. Sanborn Head will notify EPA, MassDEP, and W.R. Grace via email if Potentially Contaminated Soil is encountered. If such soil is encountered, W.R. Grace will collect and analyze soil samples in the area of the Potentially Contaminated Soil to determine the potential presence of soil with contamination present at concentrations above the ROD cleanup levels. Proposed sampling shall be coordinated with and subject to EPA approval prior to implementation. Samples shall be collected from the sides and bottom of the excavation and analyzed for VOCs, PCBs, and semi-volatile organic compounds (SVOCs). The laboratory detection limits for the soil samples will need to be at a level that allows comparison to the ROD cleanup criteria and Massachusetts Contingency Plan (MCP) Reportable Concentrations for S-1 soil (RCS-1) standards.

Should soil concentrations exceed ROD cleanup criteria, W.R. Grace shall determine the extent of the impacted soil. Soil that is identified as Significantly Contaminated Soil (i.e., above the 1989 Record of Decision and 1991 Consent Decree soil action levels) will be segregated and stockpiled separately from other excavated soil as described in Section 6.3 and illustrated on Figure 1. Management and off-Site disposal of Significantly Contaminated Soil shall be in a manner consistent with the October 18, 2011 “Soil

Management Work Plan (revision 1), W.R. Grace and Co., 369 Washington Street, Woburn, MA" and June 19, 2012 "Soil Management Evaluation and Response Plan, Revision 1, W.R. Grace and Co., 369 Washington Street, Woburn, MA" documents, copies of which are provided in Appendix B.

Areas from which Significantly Contaminated Soil has been removed, if any, will be marked so that they can be surveyed by W.R. Grace and its consultants, and incorporated into the Site plan. A representative for W.R. Grace will provide formal written notification to EPA within 24-hours upon determining that Significantly Contaminated Soil was encountered during the Site redevelopment work. Excavated soil shall be handled in accordance with applicable federal, state, and municipal environmental laws and regulations. W.R. Grace will collect and analyze soil samples from the sides and bottom of the Significantly Contaminated Soil excavation area to document concentrations of contaminants left in place. The soil samples will be analyzed for VOCs, PCBs, and semi-volatile organic compounds (SVOCs). The laboratory detection limits for the soil samples will need to be at a level that allows comparison to the ROD cleanup criteria.

We understand that EPA and MassDEP will perform periodic field oversight of intrusive activities conducted on the Site to ensure that:

- Potentially Contaminated Soil, Significantly Contaminated Soil (if any) and/or groundwater with contaminant concentrations greater than ROD cleanup standards are appropriately managed and addressed;
- The remedy, including the monitoring well network, is protected/preserved;
- Public health and environment remain protected; and,
- Work is done in accordance with the final approved Soil and Groundwater Management Plan.

6.2 Backfilling of Excavations

The excavations for building footings and utilities will be backfilled with excavated soil. Any soil categorized as Significantly Contaminated Soil will be not used on-site as backfill. When necessary, additional fill soil will be imported from an approved commercial borrow source. Prior to importing soil for backfill purposes, the Contractor shall submit the proposed borrow source for review by Sanborn Head. The Contractor shall not import soil to the Site without prior approval from Sanborn Head and EPA.

Sources of imported backfill soil will be evaluated as to their suitability for reuse at the Site by Sanborn Head. This evaluation will include a review of available state files regarding the fill source and a Site reconnaissance to evaluate the potential for contamination at the source location. In addition, and prior to transportation to the site, Sanborn Head will collect samples of imported fill soil (excluding crushed stone products) at a frequency of one soil sample per 500 cubic yards. The soil samples will be analyzed for common pre-disposal characterization parameters, including:

- VOCs by EPA Method 8260B
- SVOCs by EPA Method 8270
- PCBs by EPA Method 8082
- Volatile Petroleum Hydrocarbons (VPH) and Extractable Petroleum Hydrocarbons (EPH) by MassDEP methods MADEP-EPH-04-01 and MADEP-VPH-04-1.1, respectively.
- Pesticides and herbicides
- Priority Pollutant 13 Metals (antimony, arsenic, beryllium, cadmium, chromium, copper, lead, mercury, nickel, selenium, silver, thallium, and zinc)
- Ignitability, corrosivity, and reactivity

The soil sample results will be compared to the established cleanup levels provided in the ROD. For contaminants that do not have an established ROD cleanup level, the sample results will be compared to the MCP RCS-1 concentrations. Laboratory detection limits will be sufficiently low enough to allow comparison to the ROD cleanup criteria and RCS-1 concentrations. If the soil analytical results exceed either the ROD cleanup levels or RCS-1 concentrations, the common fill represented by the sample will be rejected. Sanborn Head will provide borrow source information and laboratory data to EPA for review and approval prior to importing the soil to the Site. EPA will attempt to provide a determination as to the suitability of the borrow source material within approximately one week of receiving all necessary information related to the source, including laboratory analytical results; however, approval is not implied or automatic in the absence of a response from EPA within one week. EPA will respond with either a direct verbal or written (via email) determination.

The Contractor shall not import soil to the Site that contains contaminants at concentrations exceeding the ROD cleanup Levels and RCS-1 concentrations. Sanborn Head will provide the sampling data to EPA, MassDEP, and W.R. Grace for their records.

6.3 Soil Stockpiling

During earthwork activities, it is anticipated that soil will be excavated and temporarily stockpiled adjacent to the work area pending reuse as backfill. Such temporary stockpiling will be performed on a regular basis as utilities and foundation elements are installed.

Imported (borrow sourced) and non-imported (currently in-situ) soil stockpiles will be covered with polyethylene sheeting at least 10 mils thick when the stockpile is not being modified to prevent fugitive dust emissions and to control potential soil run-off from rain events. Polyethylene sheeting layers will overlap a minimum of 10 feet and ballast will be placed on the edges of seems that may be susceptible to blowing open in the wind.

If geotechnically unsuitable soil is encountered during earth work activities, the soil will be excavated and temporarily stockpiled pending reuse in future landscaped areas. If the geotechnically unsuitable soil cannot be reused on-Site, the soil will be analyzed for common pre-disposal characterization parameters, as described above in Section 6.2, and shipped off-Site to an appropriate disposal facility.

Soil that is found to be Potentially Contaminated Soil will be handled and stockpiled separately from the temporary stockpiles of other soil. If present, Potentially Contaminated Soil and/or Significantly Contaminated Soil will be stockpiled on two layers of nylon reinforced polyethylene sheeting at least 10 mils thick and covered with one layer of the same when material is no longer being added to stockpile, or at the end of the work shift, whichever is sooner. Polyethylene sheeting layers must overlap a minimum of 10 feet. The bottom layer of the polyethylene sheeting will be draped over the hay bales along the perimeter of the contaminated soil stockpile staging area, in the approximate location shown on the attached Figure 1.

Sanborn Head will regularly inspect stockpiles at the start, middle, and conclusion of the work day. The Contractor shall maintain stockpiles and protective coverings for the duration of the work until the soil is shipped off-Site to a disposal facility approved by EPA in accordance with its off-site rule. Stockpiles will also be inspected twice daily by the Contractor (before and at the end of the work day). Equipment used to manage Significantly Contaminated Soil shall be decontaminated after use and prior to use for other on-Site activities, as discussed in Section 7.0 below.

6.4 Drilling Activities

Prior to the start of construction, a drilling program may be performed for geotechnical purposes. While the scope of the program is still being developed, the drilling techniques will likely require hollow stem auger drilling with a standard truck rig and split spoon soil sampling. If drive and wash drilling and/or rock coring is utilized, the resulting process water and groundwater will be directed to the on-Site treatment system. The recovered sediment would be considered excavated soil as described in this plan and field screened with a PID using the procedures described in Appendix A. We do not anticipate that soil samples collected during this drilling program will be submitted for environmental laboratory analysis. During the drilling, Sanborn Head will collect split-spoon soil samples, field classify the soil, field screen the soil with a PID using the procedures described in Appendix A, and potentially submit certain soil samples for geotechnical laboratory testing.

Drill cutting soil that is not Potentially Contaminated Soil will be temporarily stockpiled adjacent to the borehole and then used as backfill after the boring is complete. Drill cutting soil will be returned to the borehole in the approximate order in which it was removed. Excess drill cuttings will be spread on the ground surface after the borehole drilling is complete. If soil is encountered which exhibits visual, olfactory, ambient air monitoring equipment evidence of contamination, or a PID headspace screening of greater than 10 ppmv, that soil will be placed in 55-gallon drums with secondary containment. If these conditions are encountered, appropriate notifications will be made as described further in Section 12.0 below. W.R. Grace will collect a sample of the impacted soil and submit for analysis of VOCs, SVOCs, PCBs, VPH, and EPH. Drilling equipment shall be decontaminated after use as discussed in Section 7.0 below.

7.0 DECONTAMINATION PROCEDURES

Soil sampling equipment, including glass jars for headspace screening, shall be decontaminated with an aqueous wash and methanol rinse. The rinse shall consist of a non-phosphate detergent and water wash, a tap water rinse to remove the detergent, and a methanol rinse. Non-hazardous solid waste, such as personal protective equipment and disposable sampling equipment, will be collected in plastic bag-lined garbage cans, removed from the Site, and regularly disposed of at a non-hazardous waste landfill or incinerator.

Drilling equipment will be decontaminated between borings using a steam cleaner and a decontamination pad. A schematic of the temporary decontamination pad is attached as Figure 2. Generated liquid will be transferred to 55-gallon drums so that particulate matter is allowed to settle. The water shall be transferred to the on-Site treatment facility for treatment and the sediment shall be shipped off-Site for disposal, following characterization, or reused as fill on the Site, as appropriate.

During construction, visible soil shall be removed from excavation equipment used to manage Significantly Contaminated Soils with a hard bristled broom or shovel. After visible soil is removed from the equipment, a decontamination rinse shall be performed over a decontamination pad at the exit of the Site. The Contractor will be responsible for constructing and maintaining the decontamination station. Construction vehicles and equipment exiting the Site must have visible soil removed prior to exiting to the public ways. A schematic of a typical vehicle and equipment decontamination pad is attached as Figure 2 and the approximate location of the decontamination pad is shown on Figure 1. If the Contractor’s design of the vehicle and equipment decontamination pad varies significantly from the attached schematic, an updated schematic will provided to EPA, MassDEP, and W.R. Grace prior to construction. Generated liquid from the vehicle and equipment wash will be transferred to the on-Site treatment facility for treatment and the sediment shall be shipped off-Site for disposal, following characterization, or reused as fill on the Site, as appropriate.

8.0 GROUNDWATER MANAGEMENT

As discussed earlier, the proposed redevelopment project was designed to limit the need to encounter and manage groundwater. However, this section has been prepared to describe the actions to be taken should groundwater be encountered. Groundwater that is encountered will be contained in 55-gallon drums or a fractionalization tank, so that particulate matter is allowed to settle. The water will be pre-treated to remove sediment with a bag filter and/or carbon vessels, as needed. The water will then be transferred to the on-Site treatment facility for treatment. The accumulated sediment would be shipped off-Site for disposal, following characterization, or reused as fill on the Site, as appropriate.

Rainwater that accumulates in trenches or other depressions shall be allowed to infiltrate into the subsurface. If this water must be managed before it infiltrates to move the construction forward, then the water shall be handled similar to groundwater and directed to the on-Site treatment facility. Accumulated stormwater that comes into contact with non-imported soils shall not be discharged to the local stormwater collection system unless approved under appropriate permits.

9.0 DUST CONTROL AND AIR MONITORING

9.1 Work Zone Monitoring

VOC and particulate levels will be monitored by Sanborn Head's field representative in the active work zone using a PID and a MIE personal Dataram Model PDR 1000, or equivalent. This monitoring will be performed during construction related intrusive activities and during drilling activities. The Sanborn Head field representative will provide air and dust monitoring data to the Contractor so the Contractor's Health & Safety Officer can determine if its workers should upgrade to higher levels of personal protection, begin dust suppression methods (such as water spraying with a hose or a spray truck), and/or evacuate the work area if action levels are exceeded. Visual monitoring of dust conditions on the Site may also warrant the initiation of dust suppression measures. The action levels for the active work zone are summarized in the table below:

Summary of Action Levels and Respiratory Protection Requirements for Active Work Zone			
Parameters to be Measured	**Monitoring Instrument**	**Action Level***	**Action to be Taken if Action Level Exceeded**
Organic Vapors (VOCs)	PID	>5 ppm	Modify work practices Initiate periodic downgradient perimeter VOC monitoring
		>25 ppm	Stop work Upgrade to Level C
		> 250 ppm	Evacuate area and plan to upgrade to Level B
Dust	Dataram	>1 mg/m^3	Modify work practices Begin dust suppression measures

*Action levels are exceeded if reading is sustained for 1 minute

9.2 Perimeter Monitoring

Airborne dust levels will be monitored continuously along the Site perimeter using five TSI DustTrak II Model 8530 Aerosol Monitors, or equivalent, during construction related intrusive activities on the property. The approximate proposed monitoring locations are shown on Figure 1. The monitoring locations will be moved daily based on work activities, wind direction, and the location of the nearest receptors (i.e. the southern and western portions of the Site).

A quality field meteorological station will be utilized to record and download weather parameters, such as wind speed and direction, during construction. Weather parameters and monitoring locations will be included in the weekly report of activities at the Site.

The aerosol monitors will record an average PM-10 concentration, which includes particles with an aerodynamic diameter of 10 micrometers (μm) or less, measured in fifteen minute intervals. The dust monitoring data will be provided to W.R. Grace, EPA, and MassDEP in the weekly field reports. The acceptable limit for total airborne dust is a particulate concentration of 150 micrograms per cubic meter ($\mu g/m^3$) averaged over a 15-minute period and calculated as the difference in concentrations between the upwind and downwind monitoring locations. The acceptable limit is based on the EPA National Ambient Air Quality Standard (NAAQS) 24-hour average of 150 $\mu g/m^3$. The Contractor shall take the measures outlined in the table below to control dust if the limits are exceeded. Visible dust shall be prevented from leaving the Site limits.

In addition to equipment data logging, the aerosol monitors should be manually checked and readings appropriately documented on a routine basis. Manual readings, beyond response to appropriate alarms, are required to be recorded at the start, middle, and conclusion of the work day and documented as to provide backup in the event of equipment malfunction, loss of power, etc.

Summary of Action Levels for Site Perimeter			
Parameters to be Measured	**Monitoring Instrument**	**Action Level**	**Action to be Taken if Action Level Exceeded**
Organic Vapors (VOCs)	PID	>5 ppm (sustained for 1 minute)	Stop work Modify work practices
Dust	TSI DustTrack II Model 8530 Aerosol Monitors	>150 $\mu g/m^3$ (15-minute average)	Modify work practices Begin dust suppression measures

VOC monitoring will begin at the nearest downwind perimeter of the property if VOC action levels are exceeded within the work area. The Contractor shall immediately implement vapor control measures, which will be outlined in the Contractor's Health and Safety Plan (HASP), if concentrations exceeding action levels are sustained at the perimeter. Typical vapor control measures include covering the source area where vapors are being generated and reassessing the situation prior to continuing work. Tenting to control vapors may be used if the conditions warrant this type of measure.

If the perimeter action levels are exceeded for dust or VOCs, Sanborn Head will notify Madison, W.R. Grace, EPA, and MassDEP via email as soon as possible upon discovery and on the same day the condition is encountered. Within 5 days, Sanborn Head will provide to the EPA, in writing, corrective measures that were implemented to address the exceedance.

Soil borings may be advanced at the Site prior to construction. During drilling, dust and VOC monitoring will be performed in the work zone as described in the prior section. If action levels are exceeded in the work zone during drilling, perimeter readings will be taken with a handheld Dataram and PID. Perimeter readings will also be collected at the beginning and end of each work day during drilling with a handheld Dataram and PID.

10.0 EROSION AND SEDIMENT CONTROLS

Erosion and sediment controls shall be established prior to construction to mitigate the effects of run-on and run-off from the Site. A silt fence and hay bale barrier shall be constructed around the edges of the work area and hay bale barriers shall be placed around stormwater manholes, as shown on Figure 1. A Stormwater Pollution Prevention Plan (SWPPP) will be prepared for the redevelopment work at the Site, and these requirements shall be incorporated into the SWPPP to be prepared for earthwork operations at the Site. The SWPPP will be submitted for EPA review prior to implementation. The erosion and sediment controls will be inspected periodically and repaired as necessary by the Contractor, as required by the SWPPP.

Soil borings may be advanced at the Site prior to construction. Due to the nature of the proposed drilling program (i.e., using hollow-stem augers), it is not anticipated that erosion and sediment controls will be needed at the perimeter of the Site during the drilling program. During drilling activities, best management practices will be used to keep the work area tidy and to limit run-off beyond the drilling work zone.

11.0 HEALTH AND SAFETY PLANS

Sanborn Head will prepare a Health and Safety Plan to be used by their field personnel. The contractor is responsible for preparing their Health and Safety Plan to be used by their field personnel. Other consultants accessing the Site during construction will also prepare a Health and Safety Plan for their employees. Copies of the health and safety plans will be maintained on-Site and made available for informational purposes to interested parties during the redevelopment work occurring at the Site.

12.0 REPORTING PROCEDURE

Prior to the start of construction, Madison will provide to EPA, MassDEP and W.R. Grace copies of the redevelopment design plans, which will include vapor intrusion mitigation measures. After construction is completed, Madison will also provide to EPA, MassDEP and W.R. Grace as-built drawings, which will include vapor intrusion mitigation measures.

In general, as construction progresses, it is anticipated that W.R. Grace, EPA and/or their consultants may visit the Site from time to time to observe the progress of activities and to perform operation, maintenance and monitoring activities associated with the ongoing groundwater remedy. If certain conditions are encountered, the notification protocol described below will be followed to keep the project team informed. The conditions requiring notification and the parties responsible for notification and follow up work are defined as follows:

Condition	Party Responsible for Email Notification	Party Responsible for Follow Up Work
Identification of Potentially Contaminated Soil	Sanborn Head	W.R. Grace
Identification of Significantly Contaminated Soil	W.R. Grace	W.R. Grace
Groundwater is encountered during intrusive or non-intrusive activities.	Sanborn Head	Sanborn Head / Contractor

Condition	Party Responsible for Email Notification	Party Responsible for Follow Up Work
The presence of free phase NAPL in groundwater or soil within an excavation.	Sanborn Head	W.R. Grace
The discovery of an unknown underground tank, buried drums, pipelines or other containers that may have contained oil or hazardous materials.	Sanborn Head	W.R. Grace
The exceedance of organic vapors and/or dust action levels in the work zone or perimeter, as described in Section 9.0.	Sanborn Head	Sanborn Head / Contractor
A breach in erosion control.	Sanborn Head	Sanborn Head / Contractor
The discovery of damage to the recovery well system, including any monitoring wells and underground piping.	Sanborn Head, if damage observed during construction activities W.R. Grace, if damage detected during O&M of system and not observed during construction	W.R. Grace

If any of the above conditions are encountered, the Contractor shall immediately stop work in that area and notify Sanborn Head. Sanborn Head will then notify Madison, W.R. Grace, EPA, TRC, and MassDEP via email using the contact information listed in Section 5.0. The notification will be performed as soon as possible upon discovery and on the same day the condition is encountered. A W.R. Grace representative will be responsible for making a formal written notification to EPA within 24-hours of receiving notification from Sanborn Head if any of the listed unanticipated conditions are encountered.

In the event that free phase NAPL is observed in groundwater or soil within an excavation, or if an unknown underground tank, buried drums, pipelines or other containers that may have contained oil or hazardous materials is discovered, Sanborn Head and the Contractor shall comply with EPA's December 11, 2014 comfort-status letter addressed to Madison Woburn Holding, LLC, and take all reasonable steps to stop any continuing release; prevent any threatened future release; and prevent or limit human, environmental, or natural resource exposure to any previously released hazardous substance. Some of the actions necessary to satisfy reasonable steps include, but are not limited to, the series of bullets listed in the comfort letter. Sanborn Head and the Contractor will work with W.R. Grace, its environmental consultant, and EPA to respond to the conditions described above. A copy of the comfort letter is provided as Appendix C.

In addition to the notification protocols discussed above for certain conditions, weekly field reports will be provided to the EPA, MassDEP, and W.R. Grace. Weekly field reports will include a summary of soil management activities and soil management locations, instrument and meteorological readings, soil stockpile conditions and management, approximate off-Site shipment volumes, representative photographs (annotated) of Site soil management activities and corrective actions (if any). Copies of environmental monitoring data and laboratory data will be provided within weekly field reports to EPA, MassDEP, and W.R. Grace.

Madison and other Contractors will prepare weekly schedules, schedule modifications, and monthly progress reports for distribution to EPA, MassDEP, and W.R. Grace. It is anticipated that Sanborn Head will transmit to EPA, MassDEP and W.R. Grace weekly packages that include the weekly field report for the week, with monitoring and laboratory data, and a schedule of activities planned for the upcoming week. Monthly progress reports will include a summary of the work activities completed for the prior month and an updated project schedule.

13.0 ROLES AND RESPONSIBILITIES

The following section outlines the roles and responsibilities of the key organizations involved in the project.

W. R. Grace Responsibilities

1. If Potentially Contaminated Soil is encountered, collect and analyze soil samples to determine the potential presence of soil with contamination present at concentrations above the ROD cleanup levels.

2. If the presence of Significantly Contaminated Soil is confirmed, provide notification to Madison, Sanborn Head, EPA, and MassDEP. The notification will be provided as soon as possible upon discovery and on the same day the presence Significantly Contaminated Soil is confirmed. W.R. Grace shall also be responsible for developing, in coordination with EPA, a plan for determining the spatial extent and remediation of the Significantly Contaminated Soil, including, if necessary, collecting confirmatory soil samples from the excavation bottom and/or sidewalls for analytical laboratory testing.

3. If necessary, collect samples of stockpiled Significantly Contaminated Soil designated for off-site disposal and perform analytical laboratory testing for the parameters required by the disposal facility for pre-characterization and acceptance.

4. If Significantly Contaminated Soil is encountered and stockpiled, approve the disposal facility to be used, if necessary.

5. Execute paperwork required by the disposal facility as generator of the Significantly Contaminated Soil and/or other material generated from unanticipated conditions requiring disposal.

6. Prepare and submit to the EPA documents required to remain in conformance with the ROD.

7. A W.R. Grace representative will be responsible for making a formal written notification to EPA within 24-hours of receiving notification from Sanborn Head if any of the listed unanticipated conditions are encountered.

8. Prepare shipping documentation (e.g. bill-of-lading, hazardous manifests, etc.) for W.R Grace signature.

<u>Madison Responsibilities</u>

1. Provide access to the Site by W.R. Grace, EPA and their consultants as required during the construction activities.

<u>Sanborn Head Responsibilities</u>

1. Observe the redevelopment earthwork and perform field screening using a PID as specified in this plan. Inform the Contractor in real-time during excavation as to which soils should be designated as potentially contaminated, if encountered, and which soils shall be reused as backfill on the Site.

2. Provide EPA weekly field reports including a summary of soil management activities and soil management locations, instrument and meteorological readings, soil stockpile conditions and management, approximate off-Site shipment volumes, representative photographs (annotated) of Site soil management activities and corrective actions (if any). Weekly reports will include monitoring and laboratory data and a schedule of activities planned for the upcoming week.

3. Notify Madison, W.R. Grace, EPA, and MassDEP via email if certain conditions requiring notification are encountered, as outlined in Section 12.0. The notification will be provided as soon as possible upon discovery and on the same day the condition is encountered.

4. Perform real-time dust and air monitoring in the work area and along the perimeter of the Site and provide field data to the Contractor as the work progresses. Notify Madison, W.R. Grace, EPA, and MassDEP via email within 24 hours if perimeter action levels are exceeded and provide a written report of corrective measures within 5 days.

5. Provide workers who have completed 40-hour training in Hazardous Waste Operations and Emergency Response (HAZWOPER) as required by OSHA Regulations in 40 CFR 1910.120.

6. Prepare a Health and Safety Plan for protection of its employees in accordance with OSHA Regulations.

7. Perform a review of source sites of common fill as identified by the Contractor and collect characterization samples of the common fill brought to the Site.

8. Regularly inspect stockpiles at the start, middle, and conclusion of the work day.

9. Manually record dust monitor readings at the start, middle, and conclusion of the work day.

Contractor Responsibilities

1. Provide workers who have completed 40-hour training in HAZWOPER as required by OSHA Regulations in 40 CFR 1910.120. HAZWOPER certifications for each worker should be kept on-Site.

2. Prepare a Health and Safety Plan for protection of its employees and their subcontractors (if any) in accordance with OSHA Regulations.

3. Acquire the appropriate permits needed to perform the scope of work.

4. In the event a condition requiring notification is identified based on visual or PID screening evidence, stop work in the area and notify representatives of Madison, Sanborn Head, W.R. Grace, EPA, and MassDEP as soon as possible.

5. Perform soil excavation and segregate soil that is Potentially Contaminated based on field screening by Sanborn Head. Create stockpiles and provide/maintain polyethylene sheeting.

6. Place compacted backfill in excavations using excavated material that does not exhibit evidence of significant contamination. Furnish, place, and compact additional imported material from a commercial borrow source, as necessary, after the source has been reviewed by Sanborn Head and approved by Madison and EPA.

7. If necessary, load and haul Significantly Contaminated Soil after it has been sampled, approved by EPA, and accepted for shipment to the approved disposal facility. The Contractor shall excavate and load material onto trucks for legal off-site disposal. Materials removed from the Site shall be loaded within the property boundaries. All trucks leaving the site shall be covered and cleaned of spilled debris that might fall from the trucks during transport. Soil material shall be removed from the truck tires within the designated decontamination area prior to leaving the Site.

8. Implement erosion and sediment controls as required by this plan and the project SWPP.

9. Decontamination of equipment used for soil excavation.

10. Prepare weekly and monthly schedule updates to be incorporated into the weekly field reports and monthly progress reports provided by Sanborn Head to EPA, MassDEP, and W.R. Grace.

11. Provide Site security during redevelopment.

<u>Driller Responsibilities</u>

1. Provide workers who have completed 40-hour training in HAZWOPER as required by OSHA Regulations in 40 CFR 1910.120.

2. Prepare a Health and Safety Plan for protection of its employees and their subcontractors (if any) in accordance with OSHA Regulations.

3. Acquire the appropriate notifications, such as Dig Safe clearance, needed to perform the scope of work.

4. Preparation of decontamination area for drilling equipment.

5. Drilling of soil borings and decontamination of drilling equipment.

\\wesserv1\DataShare\DATA\WESDATA\3700\3706.00\Source Files\Soil and GW Management Plan\FINAL PDF\20150424 Soil and GW Mgmt Plan.docx

FIGURES

Figure No. 1

Site Plan

Woburn Landing
369 Washington Street
Woburn, Massachusetts

Drawn By: C.Green
Designed By: C.Sobchuk
Reviewed By: P.Pinto
Project No: 3706.00
Date: April 2015

Notes

1. Base plan provided to Sanborn Head in an electronic file titled "S-1725-02-EC-Compiled" prepared by Allen and Major on May 19, 2014.
2. Proposed plan provided to Sanborn Head in an electronic file titled "C-1275-02-Linework" prepared by Allen and Major on May 19, 2014.
3. Sample locations provided to Sanborn Head in an electronic file titled "09-13-Redevelopment" prepared by Tetra Tech on May 14, 2014.
4. Only explorations located within the property boundary are shown on the figure.
5. Recovery wells that were installed as a part of the remedial action plan, which began operation on September 30, 1992, are designated as the RW series.
6. Groundwater monitoring wells and piezometers installed by others between September 1992 and June 2013 are designated as the G and P0 series, respectively.

Legend

RW7 Approximate location and designation of recovery wells

G1S Approximate location and designation of monitoring wells

Approximate location of silt fence and hay bale barrier

Approximate location of hay bale barrier, or equal around catch basin

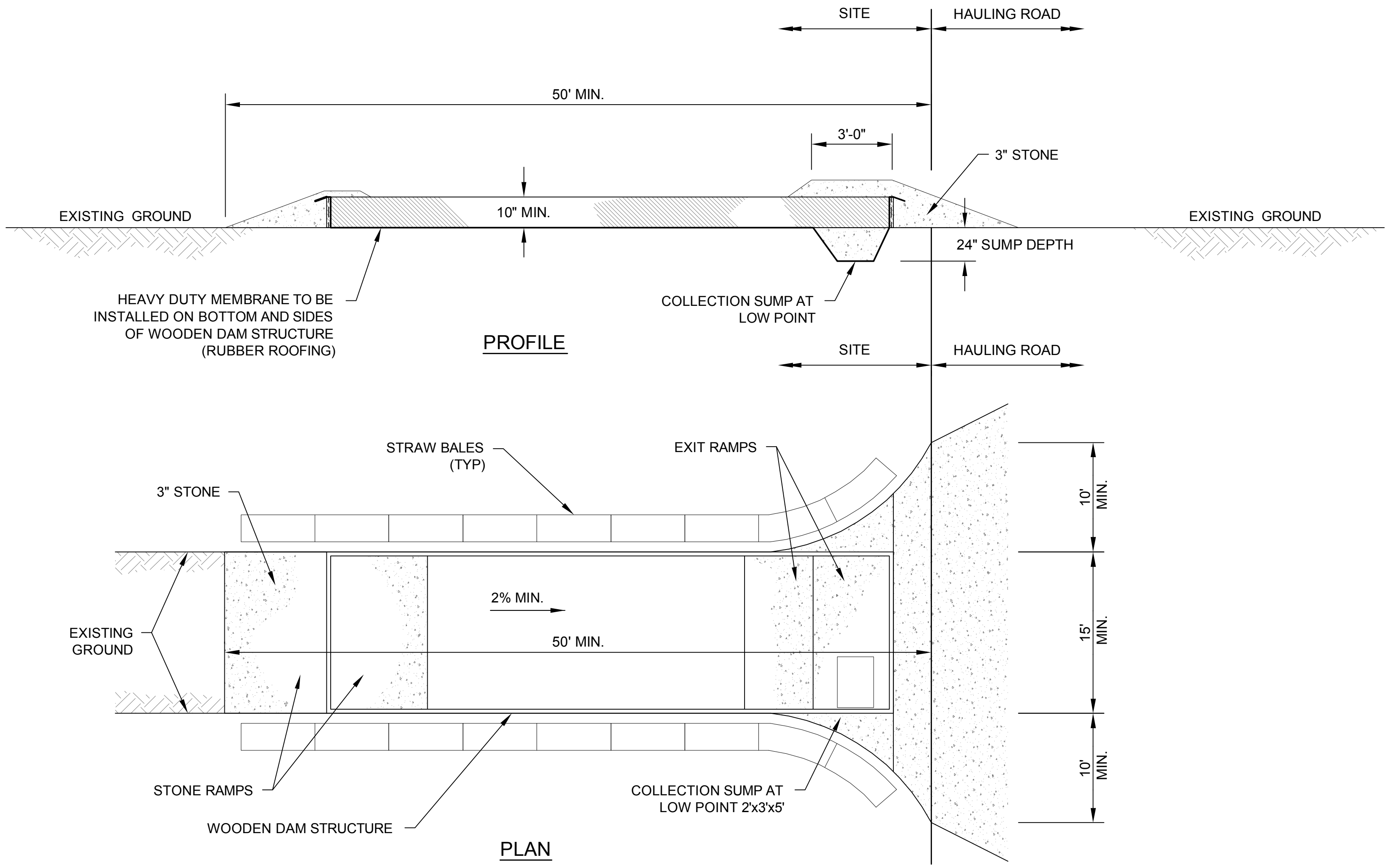
Approximate location of proposed particulate monitoring location. Locations will be adjusted during the project depending on wind direction.

Approximate location of proposed contaminated soil stockpile location

40 20 0 40 80 Feet

SANBORN HEAD

File:S:\WESDATA\3700\3706.00\Graphics Files\CAD\Soil Management Plan.dwg Plot Date: 4-24-15

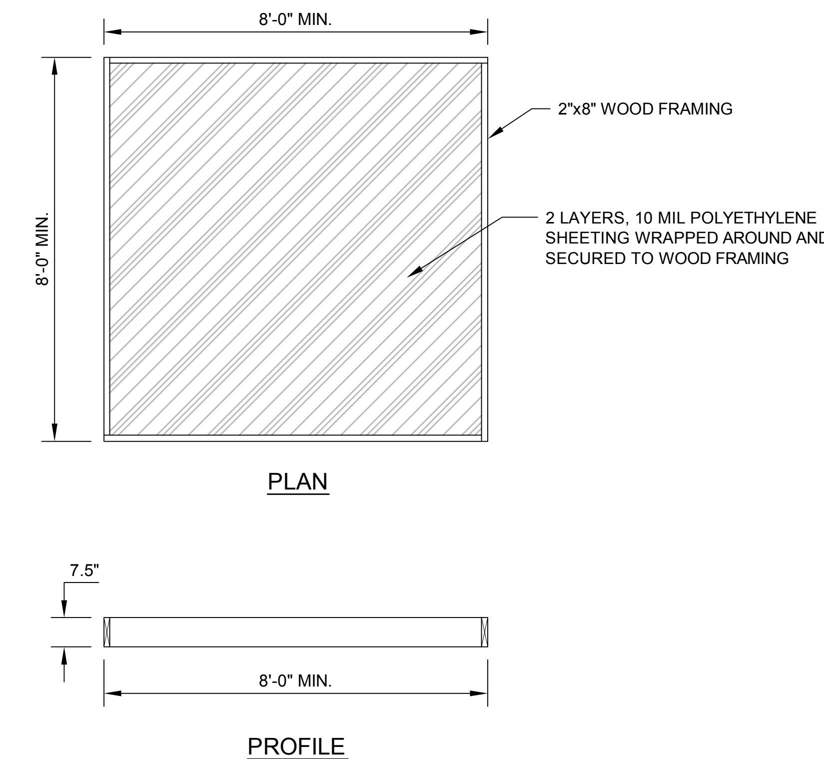


NOTES:

1. HEAVY DUTY MEMBRANE (RUBBER ROOFING) WILL BE INSTALLED IN THE EQUIPMENT WASHING AREA. 20-MIL POLY SHEETING WILL BE INSTALLED FROM THE DAMMED WASH STATION TO OVER TOP OF STRAW BALES SO AS TO ACT AS A BERM FOR CONTAINMENT OF SPLASH WATER.
2. THE DECONTAMINATION PAD WILL BE MAINTAINED IN A CONDITION THAT WILL PREVENT TRACKING OR FLOWING OF SEDIMENT OUTSIDE OF THE WASHING STATION AREA. THIS MAY REQUIRE REPAIR AND/OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT.
3. WASHING OF EQUIPMENT (TO INCLUDE WHEELS) WILL BE REQUIRED TO REMOVE SEDIMENT PRIOR TO EQUIPMENT LEAVING THE SITE.
4. PERIODIC INSPECTION AND NEEDED MAINTENANCE WILL BE PROVIDED AFTER EACH RAIN EVENT.
5. WATER COLLECTED IN THE COLLECTION SUMP WILL BE DISCHARGED TO AN ON-SITE FRAC TANK SO THAT THE PARTICULATE MATTER IS ALLOWED TO SETTLE. THE WATER WILL BE TRANSFERRED TO THE ON-SITE TREATMENT FACILITY FOR TREATMENT AND THE SEDIMENT WILL BE SHIPPED OFF-SITE FOR DISPOSAL, FOLLOWING CHARACTERIZATION, OR REUSED AS FILL ON THE SITE, AS APPROPRIATE.
6. STONE WILL BE REMOVED AT THE CONCLUSION OF PROJECT AND ACCUMULATED SEDIMENT WILL BE SHIPPED OFF-SITE FOR DISPOSAL, FOLLOWING CHARACTERIZATION, OR REUSED AS FILL ON THE SITE, AS APPROPRIATE.

1 VEHICLE AND EQUIPMENT DECONTAMINATION PAD (TYP)

NOT TO SCALE



NOTES:

1. DRILLING EQUIPMENT WILL BE DECONTAMINATED BETWEEN BORINGS USING A STEAM CLEANER ON A DECONTAMINATION PAD.
2. GENERATED LIQUID WILL BE TRANSFERRED FROM DECONTAMINATION PAD WITH A WHALE PUMP (OR SIMILAR) TO A 55-GALLON DRUM SO PARTICULATE MATTER IS ALLOWED TO SETTLE.
3. THE WASH WATER WILL BE TRANSFERRED TO THE ON-SITE TREATMENT FACILITY. SEDIMENT WILL BE SHIPPED OFF-SITE FOR DISPOSAL, FOLLOWING CHARACTERIZATION OR REUSED AS FILL ON THE SITE, AS APPROPRIATE.
4. PERIODIC INSPECTION AND NEEDED MAINTENANCE WILL BE PROVIDED DURING THE DRILLING PROGRAM.

2 DECONTAMINATION PAD DETAIL

NOT TO SCALE

SANBORN HEAD

GRAPHICAL SCALE AS NOTED

NO.	DATE	DESCRIPTION	BY

DRAWN BY: C.GREEN
DESIGNED BY: K.WALKER
REVIEWED BY: P.PINTO
PROJECT MGR: L.GARVEY
PIC: P.PINTO
DATE: APRIL 2015

369 WASHINGTON STREET
WOBURN, MASSACHUSETTS

DECONTAMINATION PAD SKETCH

PROJECT NUMBER: 3706.00

SHEET NUMBER: 2

APPENDIX A

JAR HEADSPACE SCREENING PROCEDURE

Appendix A
Jar Headspace Screening Procedure

The following describes the procedures to be followed for jar headspace screening. Procedures are adopted from the MassDEP Jar Headspace Analytical Screening Procedure outlined in DEP Policy #WSC-402-96. The headspace of each sample will be screened for the presence of VOCs utilizing a MiniRae 3000 photoionization detector (PID) (or equivalent) employing a 11.7 eV lamp following the general procedures described below. The PID will be calibrated on a daily basis according to the manufacturer's instructions.

1. Half-fill two clean glass jars with the sample to be analyzed. Quickly cover each open top with one or two sheets of clean aluminum foil and subsequently apply screw caps to tightly seal the jars. Sixteen ounce (16 oz.; approximately 500 ml) soil or "mason" type jars are preferred; jars less than 8 oz. total capacity (approximately 250 ml), should not be used.

2. Allow headspace to develop for at least 10 minutes. <u>Vigorously shake jars for 15 seconds both at the beginning and end of the headspace development period.</u> Where ambient temperatures are below 70^{o}F, headspace development should be within a heated vehicle or building.

3. Subsequent to headspace development, remove screw lid/expose foil seal. The jar cap should remain on and allow for the instrument probe penetration through the foil seal. Quickly puncture foil seal with instrument sampling probe, to a point about one-half of the headspace depth. Exercise care to avoid uptake of water droplets or soil particulate.

   As an alternative, syringe withdrawal of a headspace sample with subsequent injection to instrument probe or septum-fitted inlet is acceptable contingent upon verification of methodology accuracy using a test gas standard.

4. Following probe insertion through foil seal and/or sample injection to the probe, record highest meter response as the jar headspace concentration. Using foil seal/probe insertion method, maximum response should occur within 2 to 5 seconds. Erratic meter response may occur at high organic vapor concentrations or conditions of elevated headspace moisture, in which case headspace data should be discounted.

5. The headspace screening data from both jar samples should be recorded and compared; generally, replicate values should be consistent to plus or minus 20%.

6. PID and FID field instruments should be operated and calibrated to yield "total organic vapors" in ppm (v/v) as benzene. PID instruments must be operated with a 11.7 eV lamp. Operation, maintenance, and calibration should be performed in accordance with the manufacturer's specifications. For jar headspace analysis, instrument calibration should be checked/adjusted at least once every 10 analyses, and daily, at a minimum.

7. Instrumentation with digital (LED/LCD) displays may not be able to discern maximum headspace response unless equipped with a "maximum hold" feature or strip-chart recorder. Deviations, departures and/or additions to the above procedures should be consistent with 310 CMR 40.0017. In such cases, compelling technical justification must be presented and documented by the methodology proponent.

8. Record and compare highest PID readings for both jar samples in field book. Replicate values should be consistent to plus or minus 20%.

9. Readings exceeding action levels outlined in the Soil and Groundwater Management Plan require notification of EPA, MassDEP and W.R. Grace.

The PID will be recalibrated (or replaced as needed) throughout the day, and a calibration check will be performed following the day's investigations. Records of daily calibration, calibration gas information, response factor, etc. will be maintained on a calibration form which will be referenced in the daily entry in the field book. Field personnel will limit contact of sampling equipment and field instruments with the ground surface. Sampling equipment will be brought to the site in new plastic bags and remain in the bags until used or decontaminated prior to use.

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APPENDIX B

PRIOR REPORTS

SOIL MANAGEMENT WORK PLAN (REVISION 1)

W.R. GRACE AND CO.
369 WASHINGTON STREET
WOBURN, MASSACHUSETTS

PREPARED FOR

W.R GRACE & CO. – CONN.
62 WHITTEMORE AVENUE
CAMBRIDGE, MASSACHUSETTS 02140

PREPARED BY

TETRA TECH GEO
ONE MONARCH DRIVE
SUITE 101
LITTLETON, MASSACHUSETTS 01460
(978) 952-0120

TETRA TECH GEO PROJECT NO. 117-3008070.01 OCTOBER 18, 2011

TETRA TECH GEO

SOIL MANAGEMENT WORK PLAN (REVISION 1)

W.R. GRACE AND CO.
369 WASHINGTON STREET
WOBURN, MASSACHUSETTS

PREPARED FOR:

W.R. GRACE AND CO.
62 WHITTEMORE AVENUE
CAMBRIDGE, MASSACHUSETTS 02140

PREPARED BY:

TETRA TECH GEO
ONE MONARCH DRIVE
SUITE 101
LITTLETON, MASSACHUSETTS 01460

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1 INTRODUCTION

This Soil Management Work Plan ("the Work Plan") is designed to address soil, on the W. R. Grace & Co - Conn. (Grace) property, with concentrations exceeding Record of Decision (ROD) action levels. The Work Plan has been updated to reflect Environmental Protection Agency (EPA) comments dated July 28, 2011 (EPA, 2011) and decisions made during a September 30, 2011 meeting between EPA, the Massachusetts Department of Environmental Protection (MassDEP) and Grace.

In the EPA's May 14, 2009 letter providing comments on the Operable Unit 1 (OU-1) WR Grace Remedial Action reports, EPA indicated that there were seven locations on the Grace property where soil samples contained contaminant concentrations above the ROD action levels (EPA, 2009, page 28). The specific compounds identified by EPA as exceeding action levels included trichloroethene (TCE), tetrachloroethene (PCE), poly chlorinated biphenyls (PCB) (aroclor 1254) and EPA-designated carcinogenic poly aromatic hydrocarbons (cPAHs). The seven sampling locations are shown on Figure 1-1 and the reported concentrations for these compounds from all samples collected from these seven locations are summarized in Table 1-1. The action levels for PCE and TCE are based on potential leaching from soil into groundwater (EPA, 1989, Table 5), and the action levels for PCB and cPAHs are based on potential for direct contact under future use conditions (EPA, 1989, Table 6).

This Work Plan proposes additional soil sampling to verify and delineate the extent of soil contamination in areas where previous sample results exceeded ROD action levels. Following receipt of the soil quality results from the soil samples proposed in this Work Plan, a Soil Evaluation and Response Plan will be prepared and submitted to the EPA. The plan will summarize the results of the soil samples collected and propose appropriate response actions for areas where soil concentrations exceed ROD action levels. Appropriate response actions could range from "no further action required" to "soil excavation with confirmatory sampling" to ensure all soil above action levels is removed.

Section 2 of this Work Plan provides details regarding historic locations on the Grace property where previously-collected soil samples contained contaminant concentrations above the ROD action levels and proposes additional sampling to delineate the extent of soil contamination in those areas. Section 3 describes how the soil samples will be collected and analyzed, Section 4 provides a description of the reporting of the results and a schedule for the work, and Section 5 provides reference cited in this Work Plan.

2 HISTORIC AND PROPOSED SOIL SAMPLE LOCATIONS

Soil samples containing contaminant concentrations exceeding ROD action levels were collected during three different site investigations:

- Two of the locations (SS-14, SS-14dup, SS-17) were sampled as part of the July-October 2006 Grace property soil investigation (GeoTrans and JG Environmental, 2007a) that was performed coincident with building demolition;
- One location (RW22-B3-16) was sampled as part of the fall 2006 RW22 groundwater concentration trend investigation (GeoTrans and JG Environmental, 2007b); and
- Four locations (ECS-8, ECS-13, ECS-SS-1, ECS-SS-2) were sampled as part of the August 26, 2005 ECS Phase II Environmental Site Assessment (ESA) (ECS, 2005) investigation related to a potential property lease/transfer.

The samples were collected from the following locations as shown on Figure 1-1:

- SS-14 (1.7 feet below ground surface (bgs)) and SS-17 (2.8 feet bgs) were located beneath the former passivating area drain line;
- RW-22-B3-16 (16 feet bgs) was located on the north side of the 1966 building addition;
- ECS-8 (1-3 feet bgs) was located near the southern side of the 1966 building addition;
- ECS-13 (5-7 feet bgs) was located in the area between the former warehouse and the 1974 building addition; and
- ECS-SS-1 (0.5-1 feet bgs) and ECS-SS-2 (0.5-1 feet bgs) were located in the south drainage ditch.

Only one sampling location (ESC-8) had more than one compound present at a concentration exceeding ROD action levels.

The following sections of this report provide additional details regarding the locations on the Grace property where soil samples contained contaminant concentrations exceeding the ROD action levels and the sampling that is proposed to delineate the extent of soil contamination in those areas. The proposed soil sampling is summarized in Table 2-1.

2.1 PASSIVATING AREA DRAIN LINE (SS-14 AND SS-17)

Historic Sample Results

Soil samples SS-14 and SS-17 were collected from beneath corroded sections of the cast iron drain line beneath the former passivating area (Figure 2-1). Flow in the drain line was from the area of SS-17 toward SS-14. The PCB concentration in sample SS-17, collected beneath an elbow in the cast iron drain line, was 25,400 μg/Kg. The elbow directed flow from the passivating area floor trench drain into the drain line. The PCB concentration in SS-14 was 1,070 μg/Kg with a J qualifier. The reported concentration in SS-14 was only slightly greater than the ROD action level of 1,040 μg/Kg. A duplicate sample collected at SS-14 had a PCB concentration of 65 μg/Kg, also with a J qualifier. The J qualifiers indicate that the reported concentrations are approximate. No other samples collected beneath the former passivating area drain line contained PCBs at concentrations exceeding ROD action levels.

Proposed Sampling

Grace proposes to collect soil samples for PCB analysis along and adjacent to the former passivating area drain line between sample locations SS-17 and ten feet beyond SS-14 as well as two samples from beneath the former trench drain that flowed into the passivating area drain line. Soil samples will be collected at locations SS-14 and SS-17 and from ten additional locations to delineate soil PCB concentrations in the vicinity of these two sample locations. Locations SS-14 and SS-17 as well as the proposed ten new locations are shown on Figure 2-1. The soil samples will be collected from the depth of the former drain line to approximately 2 feet below the drain line. Soil sample SS-14 was collected at a depth of approximately 1.7 feet bgs and SS-17 at approximately 2.8 feet bgs. Therefore, to target the area beneath the former drain line, two soil samples will be collected from each of the twelve locations: a sample of soil from approximately one to two feet bgs and a sample of soil from approximately three to four feet bgs. The samples will be analyzed for PCBs using EPA Method 8082 with Microwave Extraction Method 3546.

2.2 NORTH SIDE OF 1966 BUILDING ADDITION (RW22-B3-16)

Five soil borings (RW22-B1 through RW22-B5), shown on Figure 2-2, were installed in the area of extraction well RW22 (GeoTrans and JG Environmental, 2007b). RW22-B1 was drilled using hollow stem auger rig and borings RW22-B2 through RW22-B5 were drilled using a sonic rig with a water cooled outer casing to minimize volatilization due to heating of the core barrel. Continuous samples of the unconsolidated deposits were collected from land surface to the bedrock surface. Based on field head-space screening VOC concentrations, a total of 24 soil samples from these five borings were sent for laboratory VOC analysis.

One soil sample collected at a depth of 16 feet bgs and approximately 8 feet below the water table from boring RW22-B3 had a reported TCE concentration of 15 µg/Kg. Since it was collected from below the water table, it is not a true soil sample for the ROD-stated purpose of preventing leaching of contaminants to groundwater. The initial sample was reanalyzed because two surrogate recoveries were high in the initial analysis. In the re-analysis one surrogate recovery was high, and no TCE was detected. The laboratory speculated that the difference in results between these two analyses was most likely due to sample non-homogeneity. In addition to the reanalysis, a duplicate sample from the same depth was analyzed and no TCE was detected in the duplicate sample. No TCE was detected, at a detection limit of 1.2 µg/Kg, in a soil sample collected at a depth of 6 feet from the same boring. Based on the results of the reanalysis, the duplicate sample analysis, the concentration in the shallower soil sample and the results of soil samples from the other borings in the area of RW22, it is unlikely that the TCE concentration of the soil above the water table in this area exceeds the ROD action level. Therefore, no additional soil sampling is proposed for this area.

2.3 SOUTH SIDE OF 1966 BUILDING ADDITION (ECS-8)

Historic Sample Results

The sample collected from the depth interval of 1 to 3 feet from boring ECS-8 contained TCE and PCE at concentrations of 292 and 115 µg/Kg, respectively. Photoionization detector (PID) field screening of the sample indicated a head-space concentration of 2 parts per million (ppm). PID field screening of the next deeper sample, 5 to 7 feet deep, did not detect any VOCs. No other soil samples, collected from above the water table at the Grace property contained VOC concentrations exceeding ROD action levels.

Proposed Sampling

The ECS-8 sample that contained TCE and PCE concentrations exceeding ROD action levels was located just below the former building floor slab. After ECS-8 was collected, the floor slab and building foundation were removed and the ground surface has been re-graded such that the current ground surface at the location of ECS-8 is approximately two feet lower than it was at the time that ECS-8 was collected. To determine if VOC-contaminated soil is still present in the area of ECS-8, shallow soil samples will be collected at ECS-8 and from four adjacent locations to delineate soil VOC concentrations. Location ECS-8 and the proposed four new locations are shown on Figure 2-3. Two soil samples will be collected from each of the five locations, one at approximately 0.5 feet bgs and one approximately two feet bgs. The soil samples will be collected using EnCore® Samplers and analyzed for VOCs using EPA Method 8260B with low-level detection limits.

2.4 BETWEEN FORMER WAREHOUSE AND 1974 BUILDING ADDITION (ECS-13)

Historic Sample Results

The PCB concentration of the sample collected at a depth between 5 and 7 feet from boring ECS-13 was 1,110 µg/Kg, slightly higher than the ROD action level of 1,040 µg/Kg. Boring ECS-13 was drilled in a filled portion of the south drainage ditch near the former discharge of the roof drainage system (Figure 2-4). The roof drainage discharge pipe was moved further east when the 1974 addition to the building was built.

Proposed Sampling

To delineate the soil PCB concentrations in the filled portion of the south drainage ditch, soil samples will be collected at the location of ECS-13 and from five adjacent locations. In addition, because historic soil samples collected from this location had VOC detection limits above ROD action levels, soil samples collected from this area will also be analyzed for VOCs. Location ECS-13, as well as the proposed five new locations are shown on Figure 2-4. At each of the six locations, two samples will be collected: a sample of soil from near the former surface of the drainage ditch to a depth of approximately 1 foot below the former surface and a sample from approximately 2 to 3 feet below the former surface. It is estimated that the soil samples will be collected from approximately 5 to 6 and 7 to 8 feet bgs. The actual sample depths will be determined in the field based on the ground surface elevation surveying described in Section 3.1 and field observations of the soil during sample collection. The samples will be analyzed for PCBs using EPA Method 8082 with Microwave Extraction Method 3546 and VOCs using EPA Method 8260B with low-level detection limits.

2.5 SOUTH DRAINAGE DITCH (ECS-SS-1 AND ECS-SS-2)

Historic Sample Results

The samples ECS-SS-1 and ECS-SS-2 identified in Table 1-1 were collected by ECS as part of the Phase 2 ESA (ECS, 2005). The samples were collected from the south drainage ditch to assess the presence/absence of surficial soil contamination associated with potential run-off from the Grace building and the site drainage system to the drainage ditch. These two samples contained cPAHs at concentrations exceeding the ROD action level.

Proposed Sampling

To delineate the cPAH concentrations in the area within the south drainage ditch where previous total cPAHs concentrations were greater than ROD action levels, soil samples will be collected at ECS-SS-1 and ECS-SS-2 and from eleven new locations. The thirteen locations are shown on Figure 2-5. Two soil samples will be collected at the nine locations along the bottom of the draining ditch: a sample from approximately 0.5 to 1.5 bgs and a sample from approximately 2 to 3 feet bgs. At the four locations along the side of the draining ditch, one soil sample will be collected from a depth of approximately 0.5 bgs. The samples will be analyzed for cPAHs using EPA Method 8270CSIM.

3 SAMPLING AND ANALYSIS PROCEDURES

This section describes how the soil samples will be collected and analyzed.

3.1 SURVEYING

The soil sampling locations will be located and staked by a surveyor using the coordinates obtained from CAD maps. The surveyor will also stake the proposed new soil sampling locations using coordinates that will be estimated from the locations shown on Figures 2-1 and 2-3 through 2-5. If locations have to be moved, due to encountering refusal for example, the new locations will be measured with a tape measure relative to two nearby sample locations.

The surveyors will provide the difference in ground surface elevation between the unfilled end of the South Drainage Ditch (near ECS-SS-1 on Figure 1-1) and the filled portion of the ditch in the vicinity of ECS-13. This information will be used to estimate the depth below ground surface of the former surface of the now-filled drainage ditch. This portion of the ditch was filled in approximately during the late 1960s and early 1970s during site development for the building additions and warehouse.

3.2 SOIL SAMPLING

Soil samples from between the former warehouse and 1974 building addition (ESC-13 Area) will be collected at the locations and depths described in Section 2 using a sonic rig with a water-cooled outer casing to minimize potential volatilization due to heating of the core barrel. Soil samples from all other areas will be collected at the locations and depths described in Section 2 from the sides of test pits. SOP 1 (Attachment A) describes the soil sampling procedures. Soil samples for VOC analysis will be collected using EnCore® Samplers following the procedures described in SOP 3: Soil Sampling Procedures for Analysis of Volatile Organic Compounds (Attachment A). All cuttings generated by the borings and test pits will be placed back in the boring/test pit. Sampling equipment will be decontaminated according to the procedures described in SOP 2: Decontamination of Equipment (Attachment A). All field work will be done consistent with the Health and Safety Plan for the Site (GeoTrans, 2010).

3.3 SAMPLE ANALYSIS

The soil samples will be sent to Alpha Analytical for analysis. Table 3-1 summarizes the sampling and analytical methods requirements and Table 3-2 summarizes the analytical sensitivity for parameters detected at concentrations exceeding ROD action levels. The reporting limits for all parameters included in each analysis are included in Attachment B. Low-level detection limits will be used for all VOC analyses, unless dilution is required due to elevated concentrations. One equipment blank will be collected for each analytical method and a trip blank will be included in any cooler containing VOC samples. No other quality assurance/quality control samples are proposed to be collected. In order to assure that sample integrity is maintained, site sample labeling, chain-of-custody forms, and packing and shipping requirements for the project samples will be handled according to the procedures described in SOP 4: Sample Handling and Custody Requirements (Attachment A).

4 REPORTING AND SCHEDULE

4.1 REPORTING

Following receipt of the soil quality results from the soil samples described above, a Soil Evaluation and Response Plan will be prepared and submitted to EPA. The plan will summarize results of the soil samples collected from each area and propose appropriate response action(s) for any contaminated soil exceeding ROD action levels.

4.2 SCHEDULE

The soil sampling described in this Work Plan is expected to be done in November to December 2011, weather permitting, following EPA approval of the Work Plan. A preliminary project schedule for the proposed activities is included as Figure 4-1. The schedule is meant to give a general overview of the timing of activities that will be done. The timing and duration of these activities may vary from what is shown in the schedule, as factors such as weather, resource availability and the time for obtaining approvals may impact the schedule. For the purpose of presentation, we have assumed EPA will approve the Work Plan by October 31, 2011.

5 REFERENCES

ECS, 2005. Phase II Environmental Site Assessment Report, 369 Washington Street, Woburn, MA, August 26, 2005.

EPA, 1989. EPA Superfund Record of Decision: Wells G&H, EPA ID: MAD980732168, OU 01, Woburn, MA, September 14, 1989.

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EPA, 2011. *Letter with comments on the Soil Management Work Plan*, July 28, 2011.

GeoTrans, 2010. Health and Safety Plan for Wells G&H Superfund Site, Woburn, Massachusetts, May 21, 2010.

GeoTrans and JG Environmental, 2007a. July-October, 2006 Soil Investigation Report, May 30, 2007.

GeoTrans and JG Environmental, 2007b. RW22 Area Groundwater Concentration Trend Evaluation Report, May 30, 2007.

TABLES

TABLE 1-1. SUMMARY OF SAMPLING RESULTS FROM LOCATIONS WHERE A COC CONCENTRATION EXCEEDED A ROD ACTION LEVEL

Compound	**ROD Action Level**	**RW22—B3-16**	**RW22—B3-16**	**RW22—B3-16**	**SS-17**	**SS-14**	**SS-14**	**ECS-8**	**ECS-13**	**ECS-SS-1**	**ECS-SS-2**
QA Type			Reanalysis	Dup			Dup				
Depth (feet bgs)		16	16	16	2.8	1.8	1.8	1-3	5-7	0.5 - 1	0.5 – 1
TCE	13	**15**	BRL	BRL	3.5	BRL	NA	**292**	BRL	BRL	BRL
PCE	36.7	BRL	BRL	BRL	BRL	BRL	NA	**115**	BRL	BRL	BRL
PCB-1254	1,040	NA	NA	NA	**25,400**	**1,070 J**	65 J	NA	**1,110**	NA	NA
cPAH	690	NA	NA	NA	NA	NA	NA	BRL	BRL	**25,430**	**7,252**

Notes:
Concentrations in µg/Kg
TCE Trichloroethene
PCE Tetrachloroethene
PCB Polychlorinated Biphenyl
cPAH Carcinogenic Poly Aromatic Hydrocarbons
Dup Duplicate Sample
BRL Below Reporting Limit
NA Not Analyzed
J Estimated value
Bgs Below ground surface
Bold Indicates concentration above ROD action level

TABLE 2-1. SUMMARY OF PROPOSED SOIL SAMPLING LOCATIONS, DEPTHS AND ANALYSES

Locations	Planned Sampling Depths	Number of Samples	Analysis
Passivating Area Drain Line: 12 locations SS-17, SS-14 plus 10 new locations	~1-2 & ~3-4 feet bgs at each of 12 locations	24	PCBs by EPA Method 8082 with Microwave Extraction Method 3546
South Side of 1966 Building Addition: 5 locations ECS-8 plus 4 new locations	~0.5 & ~2 feet bgs at each of 5 locations	10	VOCs by EPA Method 8260B with low-level detection limits
Between Former Warehouse and 1974 Building Addition: 6 locations ECS-13 plus 5 new locations	~5-6 & ~7-8 feet bgs at each of 6 locations	12	PCBs by EPA Method 8082 with Microwave Extraction Method 3546; VOCs by EPA Method 8260B with low-level detection limits
South Drainage Ditch: 13 locations ECS-SS-1, ECS-SS-2 plus 11 new locations	~0.5-1.5 & ~2-3 feet bgs at each of 9 locations; 0.5 feet bgs at each of 4 locations	22	cPAHs by EPA Method 8270CSIM

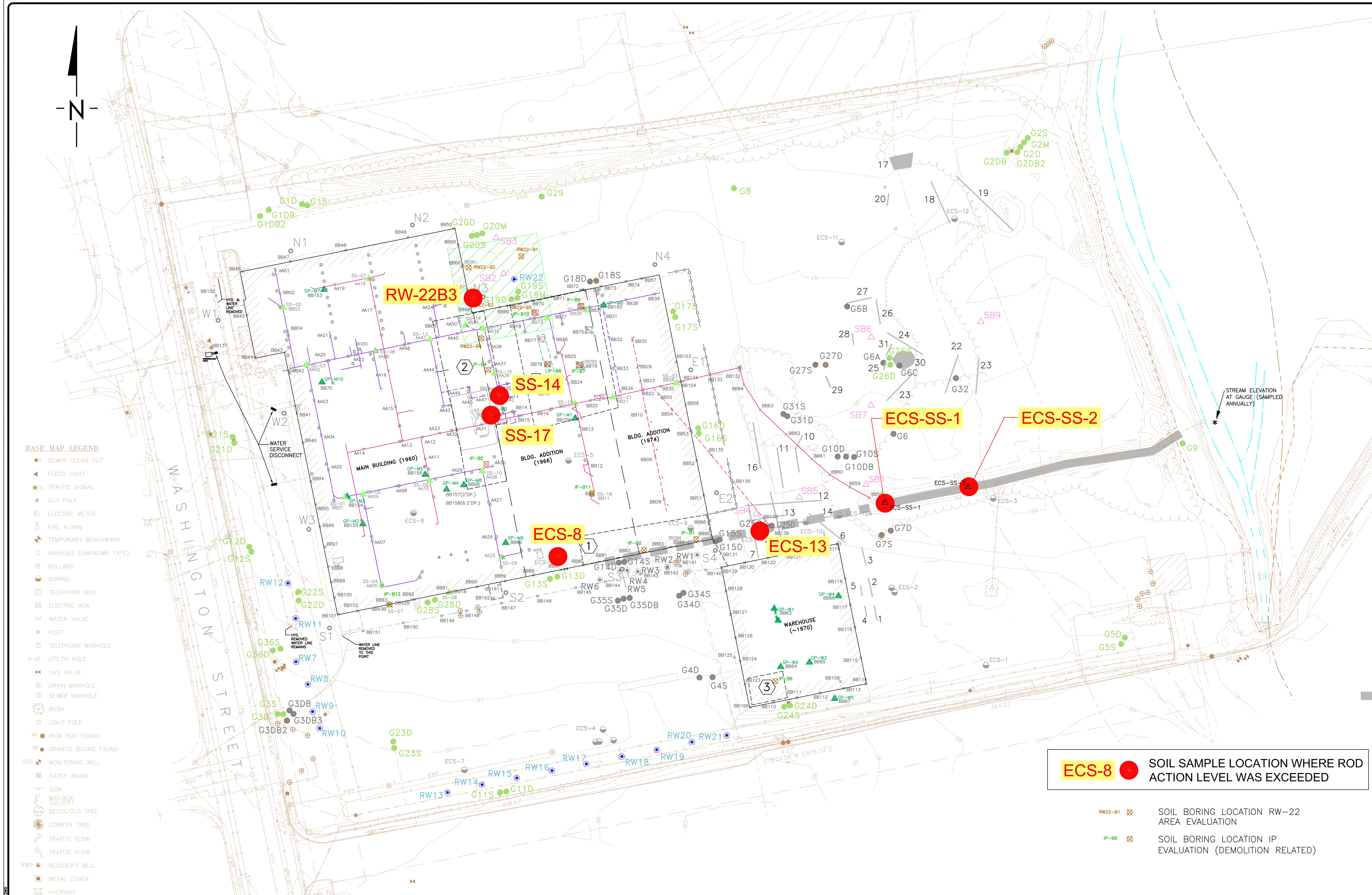
TABLE 3-1. SOIL SAMPLING AND ANALYTICAL METHODS REQUIREMENTS

Matrix	Parameter	Number of Samples	Analytical Method	Sample Containers (number, size, and type)	Sample Preservation (temperature, light, chemical)	Maximum Holding Time
Soil	PCBs	36	EPA Method 8082 with Microwave Extraction Method 3546	1-8oz amber jar	N/A	365 days
Water	PCBs	1 (Equipment Blanks)	EPA Method 8082 with Microwave Extraction Method 3546	2-1L amber jars	N/A	365 days
Soil	VOCs	22	EPA Method 8260B with low-level detection limits	3- EnCore® Samplers 1-4oz jar for moisture content	N/A	Lab must receive within 48-hrs
Water	VOCs	1 (Equipment Blank) 2 (Trip Blanks)	EPA Method 8260B with low-level detection limits	2-vial	HCL preserved	14 days
Soil	cPAHs	22	EPA Method 8270CSIM	1-8oz soil jar	N/A	14 days
Water	cPAHs	1 (Equipment Blank)	EPA Method 8270CSIM	2-1L amber jars	N/A	7 days

TABLE 3-2. ANALYTICAL SENSITIVITY FOR PARAMETERS PREVIOUSLY DETECTED AT CONCENTRATIONS EXCEEDING ROD ACTION LEVELS

Analyte	Action Level (µg/Kg)	MDL (µg/Kg)	RL (µg/Kg)	MS/MSD (% Recovery)
Tetrachloroethene	36.7	0.160	1	<30
Trichloroethene	12.7	0.187	1	<30
cPAHs*	694	2.16 – 13.3	13	<50
PCBs*	1,040	2.46 - 10.045	33.3	<50
* Indicates range of MDLs, RLs and % recoveries. Details for individual parameters included in Attachment B. Low-level detection and reporting limits will be used for VOCs.				

FIGURES



ECS-8 — SOIL SAMPLE LOCATION WHERE ROD ACTION LEVEL WAS EXCEEDED

- G9 — MONITORING WELL
- G7 — ABANDONED MONITORING WELL
- RW16 — RECOVERY WELL
- RW1 — ABANDONED RECOVERY WELL
- 28 — EXPLORATION TRENCHES/PITS (GEOENVIRONMENTAL CONSULTANTS, 1983)
- SB9 — EPA SOIL BORING LOCATION (EBASCO,1988)
- ECS-3 BORING / ECS-SS-1 SOIL SAMPLE — DECATHLON SOIL BORING & SOIL SAMPLE LOCATION (ECS, 2005)
- SOUTH DRAINAGE DITCH DASHED WHERE FILLED
- REGION OF SOIL BORINGS FOR RW-22 AREA EVALUATION
- 1 — PRE-SPECIFIED POTENTIAL SOURCE OF HISTORIC RELEASE
- TENTATIVE GROUND SCAR LOCATION AS INDICATED IN EPA 1988 SITE ANALYSIS
- SS-18 AA34 — TEST PIT/SOIL SAMPLING LOCATIONS (SS-# = SOIL SAMPLE ID.)
- TRC001 — EPA SOIL SAMPLE LOCATION (2006)
- GP-7 — GEOPHYSICAL SURVEY ANOMALY TEST PIT
- BB12 × — FIELD SOIL HEAD-SPACE SCREENING LOCATION (PID)
- AREA 4 GROUND SCAR TEST PITS
- RW22-B1 — SOIL BORING LOCATION RW-22 AREA EVALUATION
- IP-B9 — SOIL BORING LOCATION IP EVALUATION (DEMOLITION RELATED)

NOTE:

1. BASE MAP AND WELL LOCATIONS WHEN POSSIBLE PROVIDED BY CARTER & BURGESS PLAN TITLED "EXISTING CONDITIONS PLAN WASHINGTON STREET WOBURN, MASSACHUSETTS" DATED JULY 28, 2005 PREPARED BY CHAS. H. SELLS, INC.

2. EXPLORATION TRENCHES/PITS DIGITIZED FROM MAP TITLED "CRYOVAC SITE EXPLORATION MAP" PREPARED BY GEOTRANS, INC DATED 1985.

3. BUILDING UNDERGROUND PIPING DIGITIZED FROM VARIOUS BUILDING PLANS PROVIDED BY W.R. GRACE.

4. ECS SOIL BORINGS LOCATIONS INSIDE THE BUILDING AND ECS-1 FROM MAP TITLED "SITE PLAN" PREPARED BY ECS DATED MAR. 2005 AND FROM FIELD MEASUREMENTS TAKEN BEFORE SLAB REMOVAL. ALL OTHER ECS BORINGS FROM CARTER & BURGESS BASE MAP (SEE NOTE 1).

5. US EPA SOIL BORINGS DIGITIZED FROM MAP TITLED "FIGURE 4-5 W.R GRACE PROPERTY SOIL BORING AND SURFACE WATER SEDIMENT LOCATIONS" PREPARED BY THE US EPA.

6. SILT FENCE & HAY BALE BARRIER DIGITIZED FROM SKETCH PREPARED BY CHARTER ENVIRONMENTAL, JUNE 2006

BUILDING REMOVAL SAMPLING LOCATION NOTE:

1. PRE-DETERMINED TEST PIT/SOIL SAMPLING LOCATION FROM TAPE SURVEY AT THE TIME OF SAMPLING

2. FIELD SOIL SCREENING LOCATIONS BASED ON THE FIELD SAMPLING LOCATION SKETCH MAP AND FROM THE APPROXIMATE LOCATION DESCRIPTIONS IN THE SOIL COLLECTION FIELD FORM

UNDER FLOOR PIPING EXPLANATION

- SANITARY SEWER
- ROOF DRAIN

DASH INDICATES PIPE FOUND DURING SLAB REMOVAL AND WAS NOT ON ORGINAL PLANS

0 40' Scale in feet

JG Environmental Inc. WATER RESOURCES CONSULTING

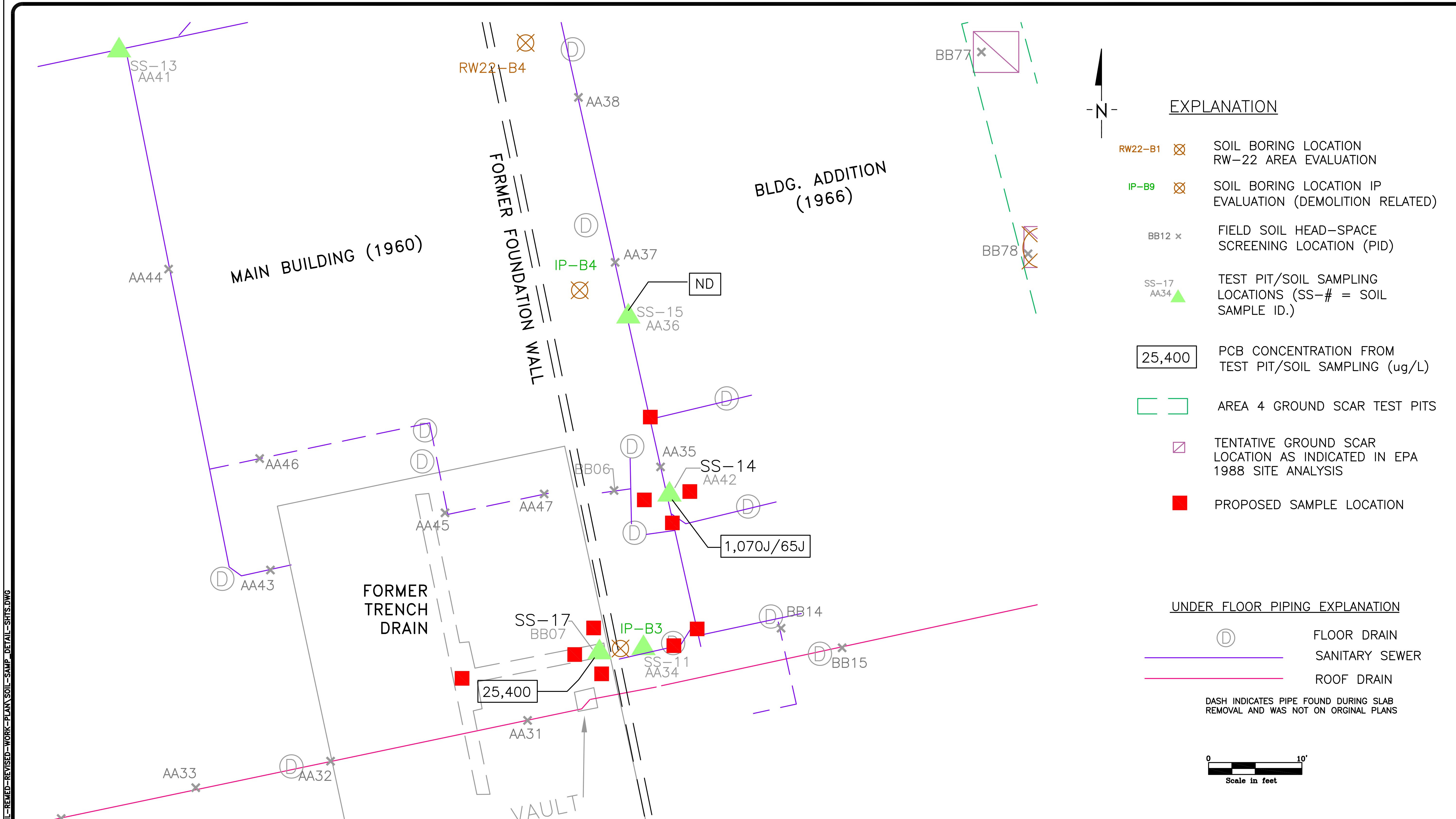
TETRA TECH GEO

TITLE: LOCATION OF SOIL SAMPLES EXCEEDING ROD ACTON LEVELS

LOCATION: W.R. Grace, Woburn, Massachusetts

APPROVED	ASB JRB
DRAFTED	RMK
PROJECT#	117-3008
DATE	OCT 2011

FIGURE 1-1



TITLE: SS-14 & 17 AREA SOIL INVESTIGATION

LOCATION: W.R. Grace, Woburn, Massachusetts

JG Environmental Inc. WATER RESOURCES CONSULTING

TETRA TECH GEO

APPROVED	ABS JRB
DRAFTED	RMK
PROJECT#	117-3008
DATE	OCT 2011

FIGURE 2-1

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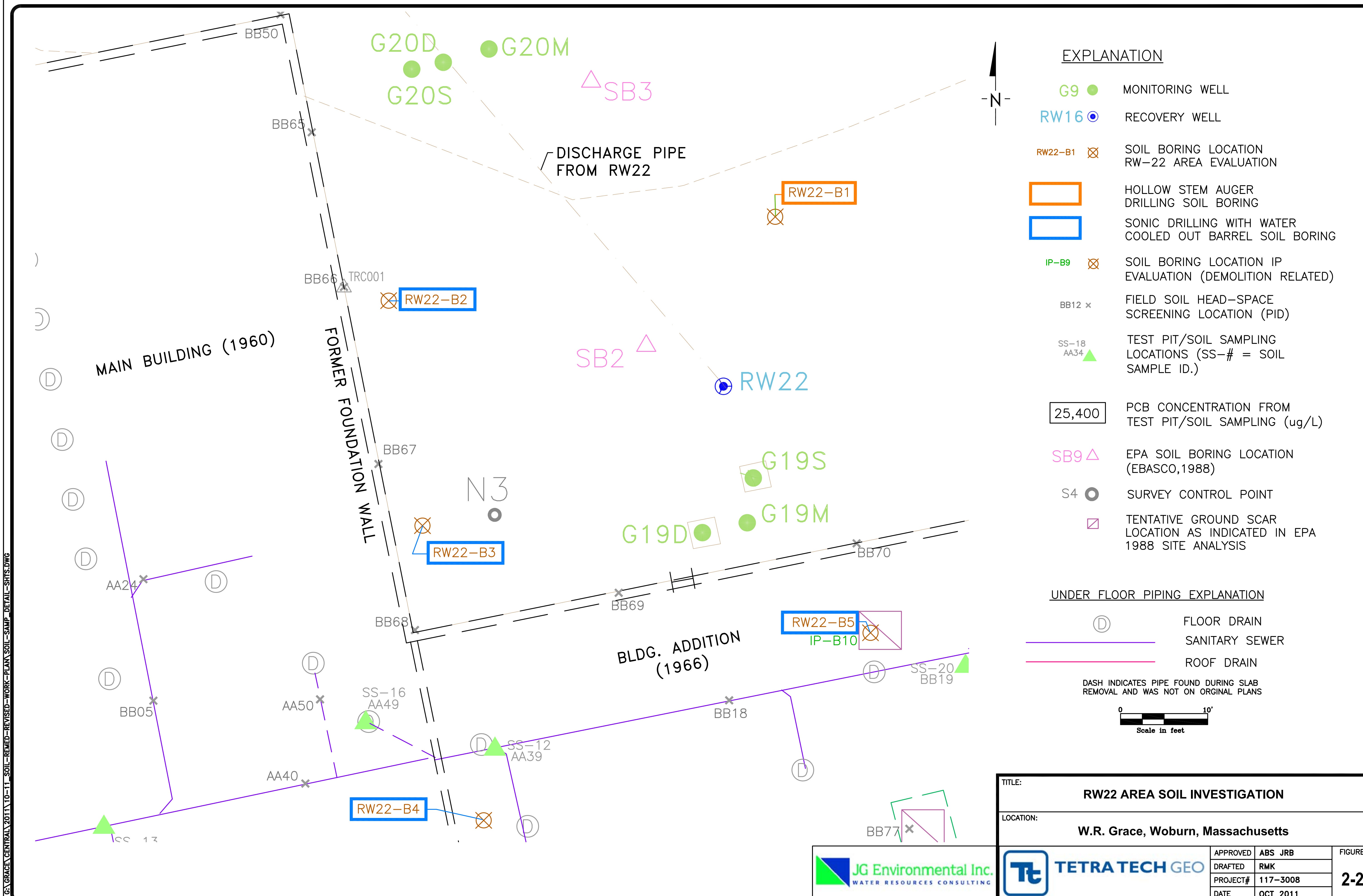

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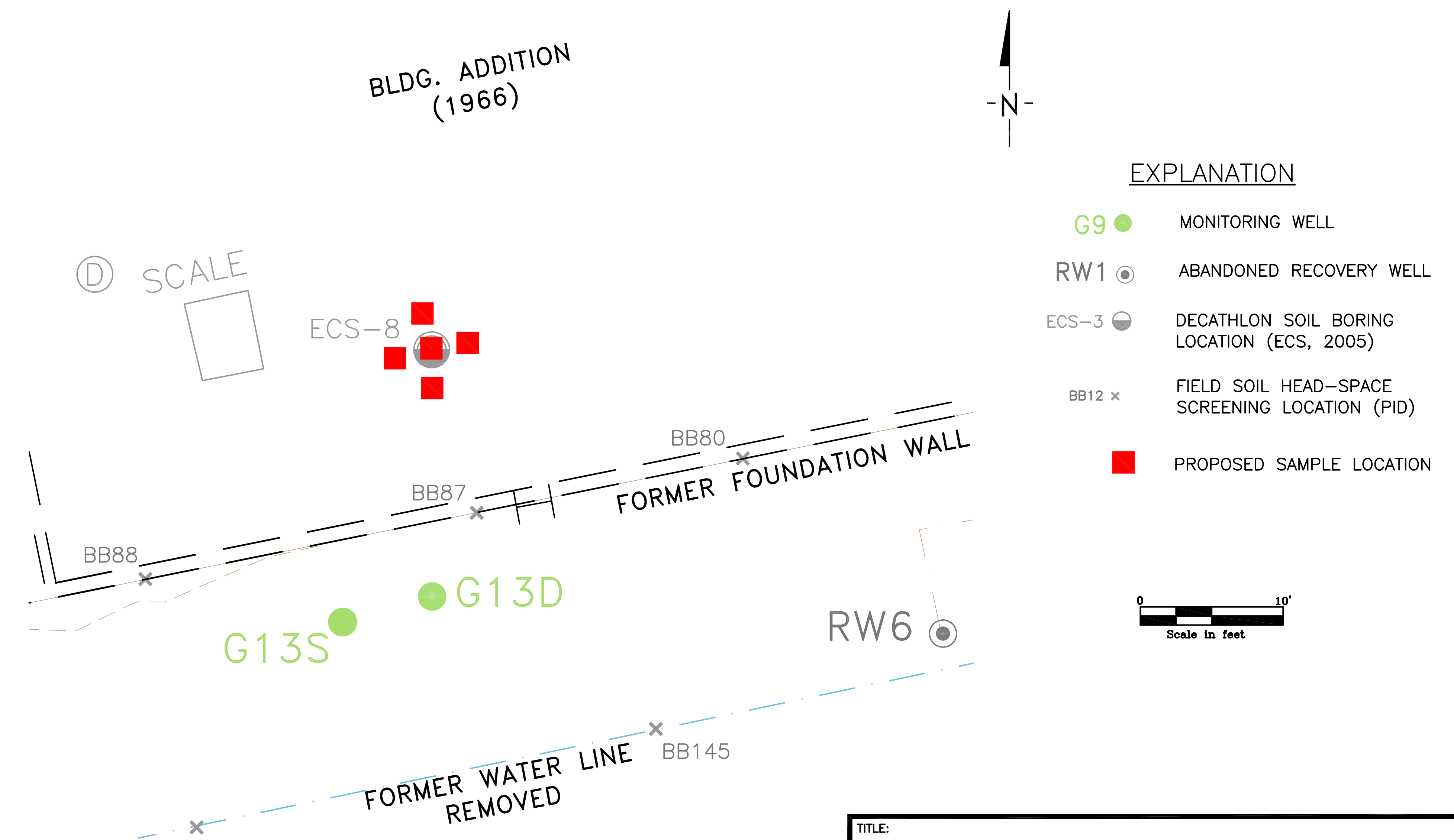
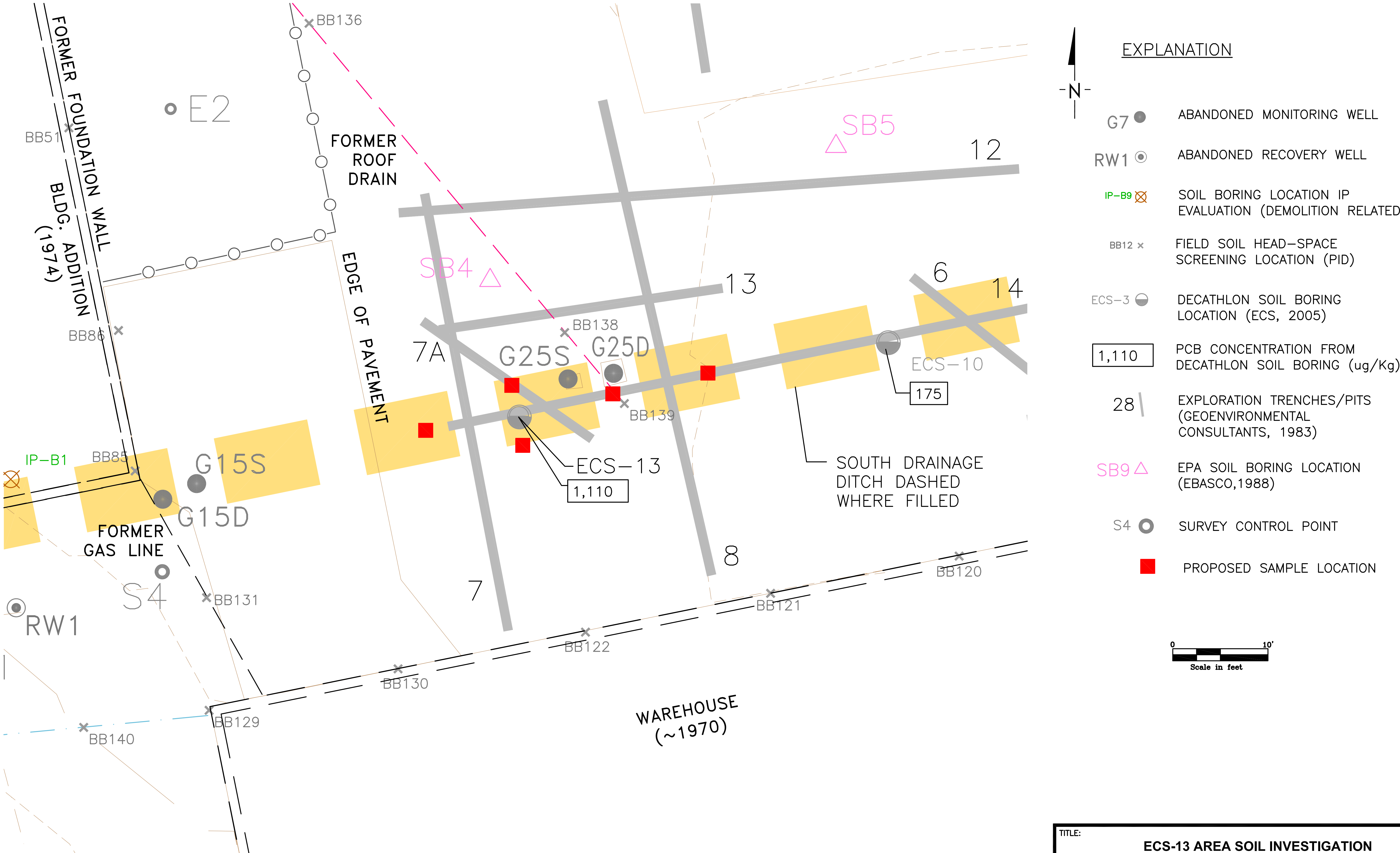


TITLE:	ECS-8 AREA SOIL INVESTIGATION
LOCATION:	W.R. Grace, Woburn, Massachusetts

JG Environmental Inc.
WATER RESOURCES CONSULTING

TETRA TECH GEO

APPROVED	ABS JRB	FIGURE
DRAFTED	RMK	2-3
PROJECT#	117-3008	
DATE	OCT 2011	



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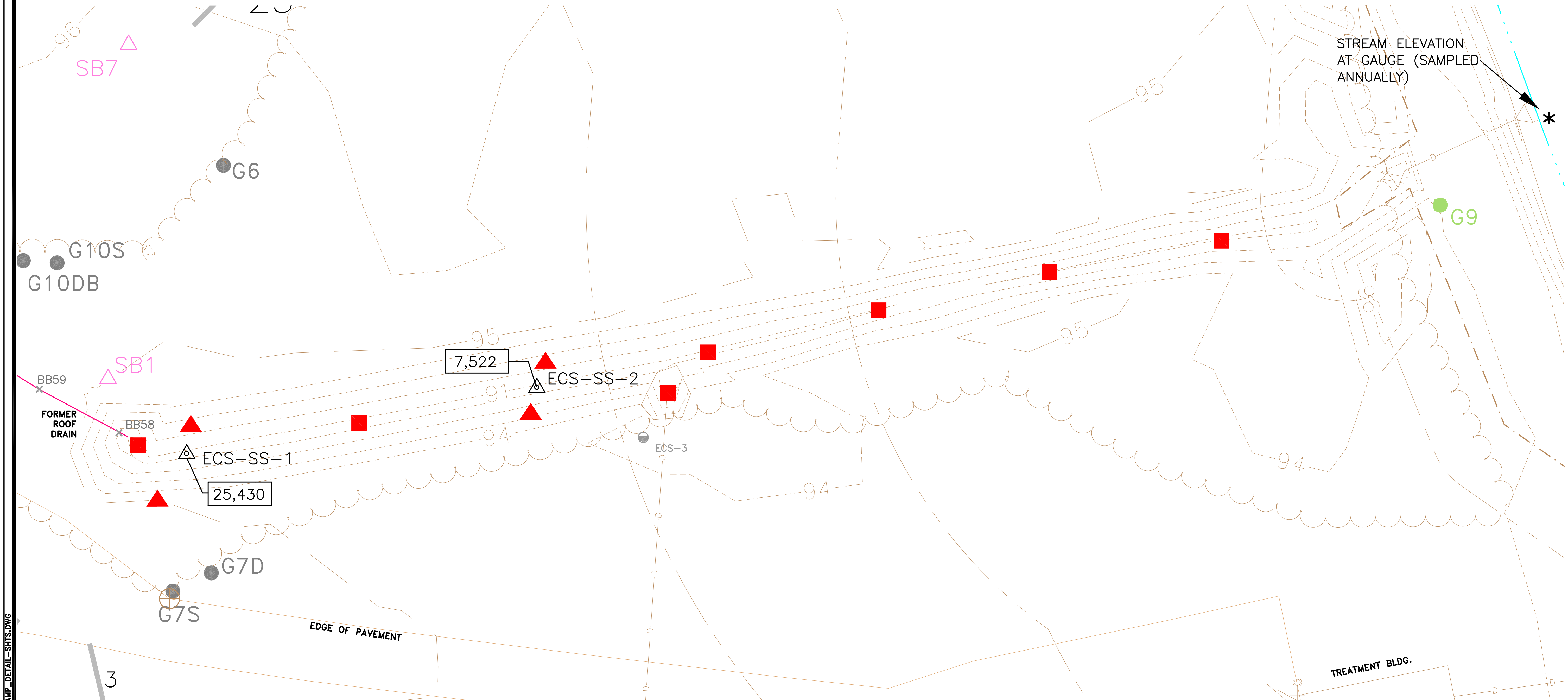
TITLE: **ECS-13 AREA SOIL INVESTIGATION**

LOCATION: **W.R. Grace, Woburn, Massachusetts**

JG Environmental Inc. WATER RESOURCES CONSULTING

TETRA TECH GEO

APPROVED	ABS JRB	FIGURE
DRAFTED	RMK	2-4
PROJECT#	117−3008	
DATE	OCT 2011	



EXPLANATION

N

G9	MONITORING WELL
G7	ABANDONED MONITORING WELL
SS-2	DECATHLON SOIL SAMPLE LOCATION (ECS, 2005)
25,430	TOTAL cPAH CONCENTRATION FROM DECATHLON SOIL SAMPLE LOCATION (ECS, 2005)
28	EXPLORATION TRENCHES/PITS (GEOENVIRONMENTAL CONSULTANTS, 1983)
BB12 ×	FIELD SOIL HEAD-SPACE SCREENING LOCATION (PID)
SB9	EPA SOIL BORING LOCATION (EBASCO,1988)
■	PROPOSED 2 DEPTH SOIL SAMPLE LOCATION
▲	PROPOSED SURFICIAL SOIL SAMPLE LOCATION

TITLE: **ECS-SS-1 & ECS-SS-2 AREA SOIL INVESTIGATION**

LOCATION: **W.R. Grace, Woburn, Massachusetts**

JG Environmental Inc. WATER RESOURCES CONSULTING

TETRA TECH GEO

APPROVED	ABS JRB	FIGURE
DRAFTED	RMK	
PROJECT#	117-3008	2-5
DATE	OCT 2011	

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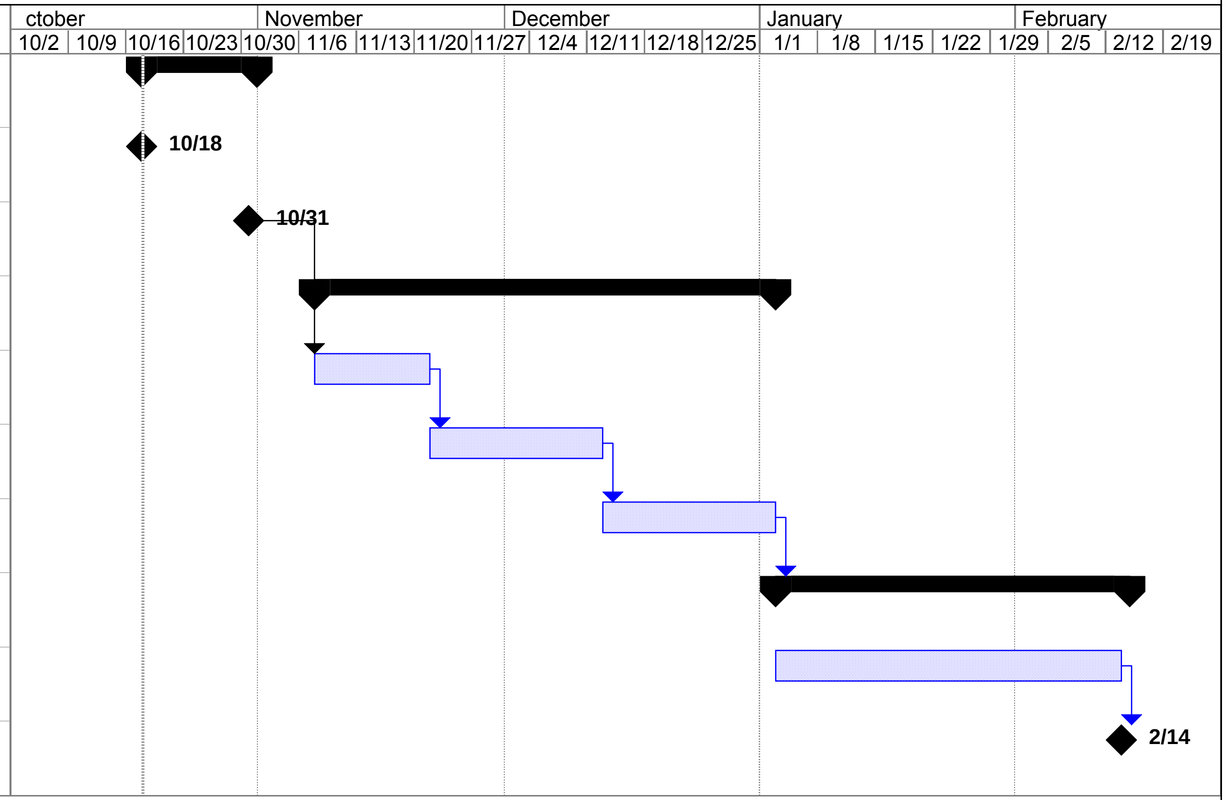
Figure 4-1. Preliminary Schedule for Soil Management Work Plan at Grace Woburn Property

ID	Task Name
1	**Soil Management Work Plan (SWMP)**
2	Submit SMWP to EPA
3	EPA Approval of SWMP
4	**Soil Sampling**
5	Survey Locations
6	Collect Soil Samples
7	Laboratory Analysis of Soil Samples
8	**Reporting**
9	Review data/prepare report/response plan
10	Submit Soil Evaluation and Response Plan to EPA



Project: Soil Schedule 101111.mpp
Date: Tue 10/18/11

Task		Milestone		External Tasks	
Split		Summary		External Milestone	
Progress		Project Summary		Deadline	

APPENDIX A

STANDARD OPERATING PROCEDURES

SOP 1: SOIL SAMPLING PROCEDURES
SOP 2: DECONTAMINATION OF EQUIPMENT
SOP 3: SOIL SAMPLING PROCEDURES FOR ANALYSIS OF VOLATILE ORGANIC COMPOUNDS
SOP 4: SAMPLE HANDLING AND CUSTODY REQUIREMENTS

SOP 1: SOIL SAMPLING PROCEDURES

This standard operating procedure (SOP) describes the procedures to collect soil samples. Soil samples will be collected with either a sonic rig with water-cooled outer barrel or from test pits. Samples of subsurface material encountered during the drilling of soil borings will typically be continuously collected to the required depth of the boring, or as directed by the supervising geologist. The supervising geologist will be responsible for documenting soil boring and test pit installation in the field boring log or notebook and for obtaining accurate and representative samples.

EQUIPMENT AND MATERIALS

The following materials, as required, shall be available during soil sampling:

- Health and safety equipment stipulated in the Health and Safety Plan
- Decontamination equipment stipulated in SOP 2: Decontamination of Equipment
- All drilling equipment required by the selected sampling method
- Appropriate sample containers and forms
- Coolers with ice or ice substitute
- Drilling Forms
- Camera
- Photoionization Detector (PID) with 10.6 eV lamp calibrated to trichloroethene
- Thermometer
- Spatula or trowel
- Field Notebook

SOIL BORING DRILLING AND SAMPLE COLLECTION

A sonic drill rig with 4-inch diameter core barrel will be used to collect soil cores from the locations specified in the Work Plan. An outer six-inch diameter casing will be advanced around the core barrel and flushed with water to cool the samples. The excess water will be captured and contained in an over flow pan and transferred to drums. Soil samples will be collected and processed by the following procedures:

Step 1 Obtain soil core

Step 2 Qualified personnel will record the following information on the field boring log or in the field note book, as applicable:

- Soil core temperature
- Soil description
- Depth

- Recovery
- Visual and olfactory observations
- Photograph core

Step 3 PID headspace screening (for locations where VOC samples are to be collected)

- Collect two samples for headspace screening
    - Preference is to collect samples at locations where visual or olfactory observations indicate contamination may be present
    - If no notable visual or olfactory observations, then collect one sample near the top of the interval and one near the bottom of the interval for headspace screening
- Record screening results on the field boring log or in the field note book, as applicable

Step 4 Collect sample for laboratory analysis

- If laboratory VOC analysis is required, soil samples will be collected with the EnCore® Sampler according to sampling procedures specified in SOP 3: Soil Sampling Procedure for Analysis of Volatile Organic Compounds. Sample depth will be selected with the following preference:
    - Sample at the depth with the highest headspace screening concentration
    - Sample at the depth with visual or olfactory observations indicating the possible presence of contamination
    - Sample in the top third of the specified interval
- If laboratory VOC analysis is <u>not</u> required, soil samples will be collected with a trowel or spoon. Sample depth will be selected with the following preference:
    - Sample at the depth with visual or olfactory observations indicating the possible presence of contamination
    - Composite sample from several locations within the specified interval

Step 5 The samples will be labeled, handled, packed, and shipped in accordance with the procedures set forth in SOP 4: Sample Handling and Custody Requirements.

Step 6 Samples will be transported to Alpha Analytical, Eight Walkup Drive, Westborough, Massachusetts, 01581-1019, (508) 898-9220.

TEST PIT EXCAVATION AND SOIL SAMPLE COLLECTION

An excavator will be used to excavate test pits to collect soil samples from the locations specified in the Work Plan. The excavator will be used to dig a test pit to the specified depth immediately adjacent to the location where a sample is to be collected. Soil samples will be collected from the side of the test pit at the specified depth(s) and processed by the procedures described below. The excavator bucket will be pressure washed between each test pit.

Step 1 Excavate test pit immediately adjacent to location where sample is to be collected

Step 2 Qualified personnel will record the following information on the field log or in the field note book, as applicable:

- Soil description
- Depth
- Visual and olfactory observations
- Photograph side wall of test pit

Step 3 PID headspace screening (for locations where VOC samples are to be collected)

- Collect two samples for headspace screening
    - Preference is to collect samples at locations where visual or olfactory observations indicate contamination may be present
    - If no notable visual or olfactory observations, then collect one sample near the top of the interval and one near the bottom of the interval for headspace screening
- Record screening results on the field boring log or in the field note book, as applicable

Step 4 Collect sample for laboratory analysis

- If laboratory VOC analysis is required, soil samples will be collected with the EnCore® Sampler according to sampling procedures specified in SOP 3: Soil Sampling Procedure for Analysis of Volatile Organic Compounds. Sample depth will be selected with the following preference:
    - Sample at the depth with the highest headspace screening concentration
    - Sample at the depth with visual or olfactory observations indicating the possible presence of contamination
    - Sample in the top third of the specified interval
- If laboratory VOC analysis is <u>not</u> required, soil samples will be collected with a trowel or spatula. Sample depth will be selected with the following preference:

- Sample at the depth with visual or olfactory observations indicating the possible presence of contamination
- Composite sample from several depths within the specified interval

Step 5 The samples will be labeled, handled, packed, and shipped in accordance with the procedures set forth in SOP 4: Sample Handling and Custody Requirements.

Step 6 Samples shall be transported to Alpha Analytical, Eight Walkup Drive, Westborough, Massachusetts, 01581-1019, (508) 898-9220.

FIELD CLEANING PROCEDURES

Cleaning of sampling equipment is to follow the procedures specified in SOP 2: Decontamination of Equipment. The sampling equipment is to be cleaned prior to the start of sampling activities, between samples, and following the completion of sampling activities.

EQUIPMENT BLANK SAMPLING

Equipment blank samples will be collected by:

Step 1 Clean and assemble soil sampling equipment following same procedures used for collecting soil samples.

Step 2 Pour laboratory water through the sampling equipment and into bottles required for laboratory analysis.

DISPOSAL METHODS

Non-hazardous solid waste, personal protective equipment and disposable sampling equipment will be collected in plastic bag-lined garbage cans, removed from the Site, and regularly disposed of at a non-hazardous waste landfill or incinerator. All drilling cuttings generated by the borings or hand auger sampling will be placed back in the boring. Decontamination fluids will be contained and treated at the Grace groundwater treatment system.

SOP 2: DECONTAMINATION OF EQUIPMENT

The equipment decontamination procedures described herein include pre-field, in the field, and post-field cleaning of sampling equipment which will be conducted in the field. Non-disposable equipment will be cleaned after completing each sampling event, between sampling events, and prior to leaving the site. Cleaning procedures of sampling equipment will be monitored through collection of equipment blank samples.

FIELD CLEANING PROCEDURES

A designated area will be established to conduct cleaning of sampling equipment in the field prior to and between sample locations. Equipment cleaning areas will be set up within or adjacent to the specific work area.

Field Cleaning Materials.

The following materials, as required, will be available during field cleaning procedures:

- Health and safety equipment stipulated in the Health and Safety Plan
- Distilled/deionized water
- Non-phosphate soap (Liquinox)
- Tap water
- Rinse collection plastic containers
- Brushes
- Plastic sheeting
- Large heavy duty garbage bags
- Spray bottles
- Resealable type bags
- Handiwipes
- Field notebook

Cleaning of Equipment

Step 1 Non-phosphate detergent and water wash to remove all visible particulate matter and any residual oil or grease.

Step 2 Tap water (or distilled/deionized water) rinse to remove the detergent solution.

Step 3 Distilled/deionized water rinse.

DISPOSAL METHODS

Non-hazardous solid waste, personal protective equipment and disposable sampling equipment will be collected in plastic bag-lined garbage cans, removed from the Site, and regularly disposed of at a non-hazardous waste landfill or incinerator. Decontamination fluids will be contained and treated at the Grace groundwater treatment system.

SOP 3: SOIL SAMPLING PROCEDURES FOR ANALYSIS OF VOLATILE ORGANIC COMPOUNDS

This standard operating procedure (SOP) describes the field sampling procedures to collect soil samples for the analysis of volatile organic compounds (VOCs). Soil samples will be collected in a manner that will minimize the loss of VOCs through volatilization and biodegradation. This SOP presents the procedures to collect soil samples for low-level (sample concentrations less than 200 µg/Kg, wet weight) and high-level (sample concentrations greater than 200µg/Kg, wet weight) VOC analyses using the EnCore® Sampler.

MATERIALS

The following materials, as required, shall be available during soil sampling:

- Health and safety equipment specified in the Health and Safety Plan
- Stainless steel spatula
- EnCore® Sampler T-Handle
- Field notebook
- Sample containers appropriate for specific methodology
- EnCore® Sampler
- Sample transport coolers with water, ice or ice substitute, appropriate labeling, packing, and shipping materials
- Chain-of-custody records and seals.

COLLECTION OF SAMPLE USING ENCORE® SAMPLER

Step 1 Obtain gross soil sample by selected method.

Step 2 Prepare the soil sample for sample collection by scraping away outer surface using a decontaminated stainless steel spatula or other decontaminated instrument.

Step 3 Assemble the EnCore® sample container as specified in the manufacturer's operating procedures.

Step 4 Collect soil sample as specified in the manufacturer's operating procedures.

Step 5 Using the T-handle, cap and lock the EnCore® Sampler for shipment.

Step 6 Repeat Steps 1 through 3 two additional times to collect a total of 3 samples for VOC analysis.

Step 7 Collect additional soil in a laboratory prepared 4-oz (120 mL) jar for percent moisture determination. Do not allow the sample for moisture content to be frozen.

Step 8 Place sample container on ice or ice substitute in a transportation cooler immediately after collection.

Step 9 Package and label the sample container following the procedures in SOP 4: Packaging and Shipment of Samples.

FIELD CLEANING PROCEDURES

Cleaning of VOC sampling equipment (e.g., stainless-steel sampling tools) is to follow procedures presented in SOP 2: Decontamination of Equipment. The sampling equipment is to be cleaned prior to the start of sampling activities, between samples, and following the completion of sampling activities.

DISPOSAL METHODS

Non-hazardous solid waste, personal protective equipment and disposable sampling equipment will be collected in plastic bag-lined garbage cans, removed from the Site, and regularly disposed of at a non-hazardous waste landfill or incinerator. Decontamination fluids will be contained and treated at the Grace groundwater treatment system.

SOP 4: SAMPLE HANDLING AND CUSTODY REQUIREMENTS

An established program of sample chain-of-custody procedures shall be followed during sample collection and handling in order to assure that sample integrity is maintained and data generated by the analysis of the samples is applicable to a proper evaluation of the site. The objectives of sample identification, custody, and monitoring procedures are to assure that:

1. All samples collected are uniquely labeled for identification throughout the analytical process;
2. Samples are correctly analyzed and results are traceable to field records;
3. Important sample characteristics are preserved;
4. Samples are protected from loss, damage, or tampering;
5. Any alteration of samples (e.g., filtration, preservation, or damage due to shipment or other processes) is documented; and
6. A record of sample integrity and analytical fate is established for legal purposes.

The following sections describe the sample labeling, chain-of-custody forms, and packing and shipping requirements for the project.

SAMPLE LABELING

Each sample bottle will be labeled with a selected numerical or alphanumerical designation that allows the sampling team to identify the sample for tracking purposes and allows the technical staff to correlate the results with the ongoing monitoring effort.

Additional information to be shown on the bottle label will include:

1. General site name, identification, or location;
2. Sampling location, i.e., well number or location;
3. Sampling date and time;
4. Name of person collecting the sample;
5. Preservatives which have been added to the sample; and
6. The sample analysis to be performed.

CHAIN-OF CUSTODY RECORD

Chain-of-custody records are used to ensure that samples are traceable from the time of collection until ultimate disposal. A sample is in a person's custody if any of the following criteria are met:

1. The sample is in the person's possession;
2. The sample is in the person's view after being in possession;
3. The sample has been locked up to prevent tampering after it was in the person's possession;
4. The sample was in the person's possession and was then transferred to a designated secure area.

The chain-of-custody record is initiated in the field by the individual physically in charge of the sample collection. The chain-of-custody record may be completed contemporaneously with the sample data sheet or prior to the shipment of samples to the laboratory.

The sampler is personally responsible for the care and custody of the sample until it is transferred or dispatched properly. When transferring the possession of samples, the individuals relinquishing and receiving the sample will sign, date, and write the time on the chain-of-custody record. The chain-of-custody record contains information on the date/time of sample collection, the sample identification, the sampler, the project name and number, laboratory project number, the destination of the samples, the number of containers of each sample being shipped, type of preservation, sample matrix, QC sample designation, and an itemization of the analyses requested for each sample, as well as any remarks about the sample, including special handling instructions, the method of shipment, and courier's name.

The chain-of-custody record is enclosed with the samples after it has been signed and dated by the sampler. The top copy of the chain-of-custody form will be retained by the sampler. The rest of the chain-of custody form will be placed in a plastic (preferably Ziploc) bag, and sealed in the shipping container.

PACKAGING AND SHIPPING

All samples will be packed in an insulated container with ice added immediately after sample collection. Ice cubes placed in plastic bags will be added as necessary to achieve an internal cooler temperature of 2 to 6 degrees Celsius. A container filled with water and labeled "temperature blank" will be included in each cooler. The temperature of this blank will be measured by the laboratory upon sample receipt to verify acceptable sample preservation temperature. The sample bottles will then be wrapped in bubble pads and placed upright in the cooler to cushion the samples to prevent breakage. Vermiculite and/or Styrofoam will be used as packing material. The cooler will be latched and sealed with strapping tape. A custody seal will be placed over the closed cooler and container lid to reveal any tampering. The coolers will be attended by Tetra Tech GEO personnel or placed in locked vehicles or designated storage areas until analysis or shipment to an off-site laboratory.

APPENDIX B

STANDARD REPORTING LIMITS, ALPHA ANALYTICAL, INC.

SVOCS IN SOIL AND LIQUID, EPA METHOD 8270CSIM
VOCS IN SOIL (LOW & HIGH) AND LIQUID, EPA METHOD 8260B
PCBS IN SOIL AND LIQUID, EPA METHOD 8082

Alpha Analytical Inc.
Standard Reporting Limits
Westborough, MA

SVOCs in Soil EPA 8270CSIM				
PAHs - Analytes	**MDL * ug/Kg**	**RL ug/Kg**	**LCS/MS % Rec**	**MS/MSD % RPD**
Acenaphthene	2.81	13	31-137%	< 50%
Acenaphthylene	2.94	13		< 50%
Anthracene	2.63	13	40-140%	< 50%
Benzo (a) anthracene	2.16	13		< 50%
Benzo (a) pyrene	3.68	13		< 50%
Benzo (b) fluoranthene	2.91	13		< 50%
Benzo (ghi) perylene	2.91	13		< 50%
Benzo (k) fluoranthene	13.3	13		< 50%
Chrysene	3.22	13		< 50%
Dibenzo (a,h) anthracene	2.31	13		< 50%
Fluoranthene	1.98	13	40-140%	< 50%
Fluorene	3.45	13		< 50%
Indeno (1,2,3-cd) pyrene	2.87	13		< 50%
Naphthalene	3.77	13		< 50%
Phenanthrene	2.95	13		< 50%
Pyrene	2.81	13	35-142%	< 50%
1-Methylnaphthalene	1.99	13		< 50%
2-Chloronaphthalene	3.10	13	40-140%	< 50%
2-Methylnaphthalene	4.09	13		< 50%
Additional - Analytes				
Hexachlorobutadiene	2.81	33		< 50%
Pentachlorophenol	53.3	53	17-109%	< 50%
Hexachlorobenzene	2.78	53		< 50%
Hexachloroethane	3.00	53		< 50%

Surrogates	% Recovery
2-Fluorophenol	25-120%
Phenol-d6	10-120%
Nitrobenzene-d5	23-120%
2-Fluorobiphenyl	30-120%
2,4,6-Tribromophenol	19-120%
4-Terphenyl-d14	18-120%

* Dakota 2008, Mork & Mindy 2009 Microwave,
Mork 2008, Mindy 2008 SOX - highest MDL

SVOCs in Liquid EPA 8270CSIM				
PAHs - Analytes	**MDL * ug/L**	**RL ug/L**	**LCS/MS % Rec**	**MS/MSD % RPD**
Acenaphthene	0.064	0.2	37-111%	< 40%
Acenaphthylene	0.05	0.2		< 40%
Anthracene	0.063	0.2	40-140%	< 40%
Benzo (a) anthracene	0.057	0.2		< 40%
Benzo (a) pyrene	0.069	0.2		< 40%
Benzo (b) fluoranthene	0.071	0.2		< 40%
Benzo (ghi) perylene	0.07	0.2		< 40%
Benzo (k) fluoranthene	0.068	0.2		< 40%
Chrysene	0.049	0.2		< 40%
Dibenzo (a,h) anthracene	0.073	0.2		< 40%
Fluoranthene	0.043	0.2	40-140%	< 40%
Fluorene	0.057	0.2		< 40%
Indeno (1,2,3-cd) pyrene	0.079	0.2		< 40%
Naphthalene	0.064	0.2		< 40%
Phenanthrene	0.064	0.2		< 40%
Pyrene	0.057	0.2	26-127%	< 40%
1-Methylnaphthalene	0.056	0.2		< 40%
2-Chloronaphthalene	0.066	0.2	40-140%	< 40%
2-Methylnaphthalene	0.06	0.2		< 40%
Additional - Analytes				
Hexachlorobutadiene	0.071	0.5		< 40%
Pentachlorophenol	** 0.187	0.8	9-103%	< 40%
Hexachlorobenzene	** 0.0139	0.8		< 40%
Hexachloroethane	0.065	0.8		< 40%

Surrogates	% Recovery
2-Fluorophenol	21-120%
Phenol-d6	10-120%
Nitrobenzene-d5	23-120%
2-Fluorobiphenyl	15-120%
2,4,6-Tribromophenol	10-120%
4-Terphenyl-d14	33-120%

* Mork 2008, Mindy 2008, Dakota 2008 - highest MDL
** Mork 2010, Mindy 2010, Dakota 2010 - Highest MDL

Alpha Analytical Inc.
Standard Reporting Limits
Westborough, MA

VOCs in Soil - Low EPA 8260B				
Analytes	MDL * ug/Kg	RL ug/Kg	LCS/MS % Rec	MS/MSD % RPD
Acetone	3.23	10		< 30%
Acrylonitrile	0.376	10		< 30%
Benzene	0.129	1	66-142%	< 30%
Bromobenzene	0.201	5		< 30%
Bromochloromethane	0.302	5		< 30%
Bromodichloromethane	0.229	1		< 30%
Bromoform	0.415	4		< 30%
Bromomethane	0.648	2		< 30%
Carbon disulfide	0.149	10		< 30%
Carbon tetrachloride	0.190	1		< 30%
Chlorobenzene	0.348	1	60-133%	< 30%
Chlorodibromomethane	0.308	1		< 30%
Chloroethane	0.438	2		< 30%
Chloroform	0.370	1.5		< 30%
Chloromethane	0.783	5		< 30%
cis-1,2-Dichloroethene	0.256	1		< 30%
cis-1,3-Dichloropropene	0.267	1		< 30%
Dibromomethane	0.435	10		< 30%
Dichlorodifluoromethane	0.317	10		< 30%
Ethyl benzene	0.150	1		< 30%
ethyl ether	0.380	5		< 30%
Ethyl-methacrylate	0.639	1		< 30%
Hexachlorobutadiene	0.422	5		< 30%
Isopropylbenzene	0.168	1		< 30%
Methylene chloride	0.816	2		< 30%
Methyl-tert-butyl ether	0.487	10		< 30%
Naphthalene	0.770	5		< 30%
n-Butylbenzene	0.198	1		< 30%
n-Propylbenzene	0.188	1		< 30%
o-Xylene	0.271	2		< 30%
p/m-Xylene	0.323	2		< 30%
p-Isopropyltoluene	0.191	1		< 30%
sec-Butylbenzene	0.206	1		< 30%
Styrene	0.552	2		< 30%
tert-Butylbenzene	0.561	5		< 30%
Tetrachloroethene	0.160	1		< 30%
Tetrahydrofuran	0.340	20		< 30%
Toluene	0.175	1.5	59-139%	< 30%
trans-1,2-Dichloroethene	0.178	1.5		< 30%
trans-1,3-Dichloropropene	0.143	1		< 30%
trans-1,4-Dichloro-2-butene	1.48	5		< 30%
Trichloroethene	0.187	1	62-137%	< 30%
Trichlorofluoromethane	0.231	5		< 30%
Vinyl Acetate	0.885	10		< 30%
Vinyl chloride	0.361	2		< 30%
1,1-Dichloroethane	0.206	10		< 30%
1,1-Dichloroethene	0.178	1	59-172%	< 30%
1,1-Dichloropropene	0.456	5		< 30%
1,1,1-Trichloroethane	0.193	1		< 30%
1,1,2-Trichloroethane	0.248	1.5		< 30%
1,1,1,2-Tetrachloroethane	0.318	1		< 30%
1,1,2,2-Tetrachloroethane	0.240	1		< 30%
1,2-Dibromo-3-chloropropane	0.837	5		< 30%
1,2-Dibromoethane	0.211	4		< 30%
1,2-Dichlorobenzene	0.364	5		< 30%
1,2-Dichloroethane	0.207	1		< 30%
1,2-Dichloropropane	0.233	3.5		< 30%
1,2,3-Trichlorobenzene	0.403	5		< 30%
1,2,3-Trichloropropane	0.387	10		< 30%
1,2,4-Trichlorobenzene	0.790	5		< 30%
1,2,4-Trimethylbenzene	0.573	5		< 30%
1,3-Dichlorobenzene	0.225	5		< 30%
1,3-Dichloropropane	0.173	5		< 30%
1,3,5-Trimethylbenzene	0.164	5		< 30%
1,4-Dichlorobenzene	0.301	5		< 30%
1,4-Dichloro-2-butane	0.120	10		< 30%
2-Butanone	0.500	10		< 30%
2-Chlorotoluene	0.313	5		< 30%
2,2-Dichloropropene	0.767	5		< 30%
4-Chlorotoluene	0.208	5		< 30%
4-methyl-2-pentanone	0.454	10		< 30%
Non-Standard Compounds				
1,2,4,5-tetramethylbenzene	0.905	1		< 30%
1,4-Dioxane	17.4	100		< 30%
2-Chloroethylvinyl ether	0.616	5		< 30%
2-Hexanone	0.396	10		< 30%
4-ethyltoluene	0.485	1		< 30%
Acrolein	3.01	25		< 30%
cyclohexane	0.625	5		< 30%
Diisopropyl ether	0.149	4		< 30%
Ethyl Acetate	0.128	1		< 30%
Ethyl-tert-butyl ether	0.423	4		< 30%
Freon-113	0.215	20		< 30%
Halothane	0.150	5		< 30%
Iodomethane	1.27	10		< 30%
Methyl acetate	0.466	10		< 30%
methyl cyclohexane	0.699	3.5		< 30%
p-diethylbenzene	1.00	1		< 30%
Tert-Butyl Alcohol	0.642	60		< 30%
Tertiary-amyl methyl ether	0.576	4		< 30%

Surrogates	% Recovery
dibromofluoromethane	70-130%
1,2-dichloroethane-d4	70-130%
toluene-d8	70-130%
4-bromofluorobenzene	70-130%

* Curly 2005, Laruel 2006, Newman 2010, Charlie 2010 - Highest MDL

VOCs in Soil - High EPA 8260B				
Analytes	MDL * ug/Kg	RL ug/Kg	LCS/MS % Rec	MS/MSD % RPD
Acetone	162	500		< 30%
Acrylonitrile	60.1	200		< 30%
Benzene	9.6	50	66-142%	< 30%
Bromobenzene	16.6	250		< 30%
Bromochloromethane	17.9	250		< 30%
Bromodichloromethane	19.2	50		< 30%
Bromoform	55.8	200		< 30%
Bromomethane	29.1	100		< 30%
Carbon disulfide	12.8	500		< 30%
Carbon tetrachloride	13.9	50		< 30%
Chlorobenzene	12.3	50	60-133%	< 30%
Chlorodibromomethane	16.0	50		< 30%
Chloroethane	22.0	100		< 30%
Chloroform	16.2	75		< 30%
Chloromethane	39.2	250		< 30%
cis-1,2-Dichloroethene	12.8	50		< 30%
cis-1,3-Dichloropropene	13.4	50		< 30%
Dibromomethane	21.7	500		< 30%
Dichlorodifluoromethane	86.6	500		< 30%
Ethyl benzene	19.0	50		< 30%
Ethyl ether	18.0	250		< 30%
Ethyl methacrylate	73.6	500		< 30%
Hexachlorobutadiene	21.1	250		< 30%
Isopropylbenzene	9.7	50		< 30%
Methylene chloride	22.8	500		< 30%
Methyl-tert-butyl ether	57.1	100		< 30%
Naphthalene	33.0	250		< 30%
n-Butylbenzene	41.1	50		< 30%
n-Propylbenzene	10.0	50		< 30%
o-Xylene	11.7	100		< 30%
p/m-Xylene	28.5	100		< 30%
p-Isopropyltoluene	9.7	50		< 30%
sec-Butylbenzene	10.6	50		< 30%
Styrene	30.7	100		< 30%
tert-Butylbenzene	28.0	250		< 30%
Tetrachloroethene	14.5	50		< 30%
Tetrahydrofuran	56.4	1000		< 30%
Toluene	9.5	75	59-139%	< 30%
trans-1,2-Dichloroethene	15.0	75		< 30%
trans-1,3-Dichloropropene	16.8	50		< 30%
trans-1,4-Dichloro-2-butene	73.9	250		< 30%
Trichloroethene	14.1	50	62-137%	< 30%
Trichlorofluoromethane	21.8	250		< 30%
Vinyl acetate	68.3	500		< 30%
Vinyl chloride	27.7	100		< 30%
1,1-Dichloroethane	11.8	75		< 30%
1,1-Dichloroethene	16.6	50	59-172%	< 30%
1,1-Dichloropropene	22.8	250		< 30%
1,1,1-Trichloroethane	10.2	50		< 30%
1,1,2-Trichloroethane	20.5	75		< 30%
1,1,1,2-Tetrachloroethane	16.4	50		< 30%
1,1,2,2-Tetrachloroethane	14.5	50		< 30%
1,2-Dibromo-3-chloropropane	74.1	250		< 30%
1,2-Dibromoethane	10.7	200		< 30%
1,2-Dichlorobenzene	18.2	250		< 30%
1,2-Dichloroethane	14.7	50		< 30%
1,2-Dichloropropane	12.6	180		< 30%
1,2,3-Trichlorobenzene	46.2	250		< 30%
1,2,3-Trichloropropane	20.9	500		< 30%
1,2,4-Trichlorobenzene	43.5	250		< 30%
1,2,4-Trimethylbenzene	76.3	250		< 30%
1,3-Dichlorobenzene	18.8	250		< 30%
1,3-Dichloropropane	11.7	250		< 30%
1,3,5-Trimethylbenzene	68.6	250		< 30%
1,4-Dichlorobenzene	15.3	250		< 30%
1,4-Dichlorobutane	39.2	500		< 30%
2-Butanone	194	500		< 30%
2-Chlorotoluene	15.6	250		< 30%
2-Hexanone	63.0	500		< 30%
2,2-Dichloropropane	60.6	250		< 30%
4-Chlorotoluene	14.2	250		< 30%
4-Methyl-2-pentanone	88.4	500		< 30%
Non-Standard Compounds				
1,4-Dioxane	870	5000		< 30%
2-Chloroethylvinyl ether	15.6	1000		< 30%
4-ethyltoluene	24.3	50		< 30%
Acrolein	150	1200		< 30%
Diisopropyl ether	47.7	200		< 30%
Ethyl-Tert-Butyl-Ether	43.8	200		< 30%
Freon-113	46.6	200		< 30%
Iodomethane	63.3	500		< 30%
Tert-Butyl Alcohol	62.5	500		< 30%
Tertiary-Amyl Methyl Ether	50.5	200		< 30%

Surrogates	% Recovery
dibromofluoromethane	70-130%
1,2-dichloroethane-d4 1,2-dichloroethane-d4	70-130%
toluene-d8	70-130%
4-bromofluorobenzene	70-130%

* Curly 2005, Elaine 2005, Quimby Con 1 2005, Quimby Con2 2005, Newman 2006, Laurel 2006, JackCon1 2008, JackCon2 2008 - Highest MDL

VOCs in Liquid EPA 8260B				
Analytes	MDL * ug/L	RL ug/L	LCS/MS % Rec	MS/MSD % RPD
Acetone	1.56	5.0	70-130%	< 20%
Acrylonitrile	0.430	5.0	70-130%	< 20%
Benzene	0.194	0.5	76-127%	< 20%
Bromobenzene	0.184	2.5	70-130%	< 20%
Bromochloromethane	0.329	2.5	70-130%	< 20%
Bromodichloromethane	0.192	0.5	70-130%	< 20%
Bromoform	0.248	2.0	70-130%	< 20%
Bromomethane	0.257	1.0	70-130%	< 20%
Carbon disulfide	0.299	5.0	70-130%	< 20%
Carbon tetrachloride	0.165	0.5	70-130%	< 20%
Chlorobenzene	0.192	0.5	75-130%	< 20%
Chlorodibromomethane	0.189	0.5	70-130%	< 20%
Chloroethane	0.233	1.0	70-130%	< 20%
Chloroform	0.198	0.8	70-130%	< 20%
Chloromethane	0.281	2.5	70-130%	< 20%
cis-1,2-Dichloroethene	0.187	0.5	70-130%	< 20%
cis-1,3-Dichloropropene	0.144	0.5	70-130%	< 20%
Cyclohexane	0.245	10.0	70-130%	< 20%
Dibromomethane	0.363	5.0	70-130%	< 20%
Dichlorodifluoromethane	0.300	5.0	70-130%	< 20%
Ethyl acetate	0.716	10.0	70-130%	< 20%
Ethyl benzene	0.265	0.5	70-130%	< 20%
Ethyl ether	0.205	2.5	70-130%	< 20%
Ethyl-methacrylate	0.606	5.0	70-130%	< 20%
Halothane	0.149	2.0	70-130%	< 20%
Hexachlorobutadiene	0.230	0.5	70-130%	< 20%
Isopropylbenzene	0.187	0.5	70-130%	< 20%
Methylene chloride	0.539	5.0	70-130%	< 20%
Methyl cyclohexane	0.288	10.0	70-130%	< 20%
Methyl-tert-butyl ether	0.160	1.0	70-130%	< 20%
Naphthalene	0.217	2.5	70-130%	< 20%
n-Butylbenzene	0.196	0.5	70-130%	< 20%
n-Propylbenzene	0.173	0.5	70-130%	< 20%
o-Xylene	0.330	1.0	70-130%	< 20%
p/m-Xylene	0.348	1.0	70-130%	< 20%
p-Diethylbenzene	0.108	2.0	70-130%	< 20%
p-Isopropyltoluene	0.188	0.5	70-130%	< 20%
sec-Butylbenzene	0.181	0.5	70-130%	< 20%
Styrene	0.359	1.0	70-130%	< 20%
tert-Butylbenzene	0.302	2.5	70-130%	< 20%
Tert butyl Alcohol	0.899	50.0	70-130%	< 20%
Tetrachloroethene	0.181	0.5	70-130%	< 20%
Tetrahydrofuran	1.30	5.0	70-130%	< 20%
Toluene	0.227	0.8	76-125%	< 20%
trans-1,2-Dichloroethene	0.211	0.8	70-130%	< 20%
trans-1,3-Dichloropropene	0.164	0.5	70-130%	< 20%
trans-1,4-Dichloro-2-butene	0.173	2.5	70-130%	< 20%
Trichloroethene	0.175	0.5	71-120%	< 20%
Trichlorofluoromethane	0.267	2.5	70-130%	< 20%
Vinyl acetate	0.311	5.0	70-130%	< 20%
Vinyl chloride	0.224	1.0	70-130%	< 20%
1,1-Dichloroethane	0.216	0.8	70-130%	< 20%
1,1-Dichloroethene	0.181	0.5	61-145%	< 20%
1,1-Dichloropropene	0.256	2.5	70-130%	< 20%
1,1,1-Trichloroethane	0.158	0.5	70-130%	< 20%
1,1,2-Trichloroethane	0.261	0.8	70-130%	< 20%
1,1,1,2-Tetrachloroethane	0.165	0.5	70-130%	< 20%
1,1,2,2-Tetrachloroethane	0.192	0.5	70-130%	< 20%
1,2-Dibromo-3-chloropropane	0.327	2.5	70-130%	< 20%
1,2-Dibromoethane	0.326	2.0	70-130%	< 20%
1,2-Dichlorobenzene	0.184	2.5	70-130%	< 20%
1,2-Dichloroethane	0.160	0.5	70-130%	< 20%
1,2-Dichloropropane	0.296	1.8	70-130%	< 20%
1,2,3-Trichlorobenzene	0.234	2.5	70-130%	< 20%
1,2,3-Trichloropropane	0.428	5.0	70-130%	< 20%
1,2,4-Trichlorobenzene	0.220	2.5	70-130%	< 20%
1,2,4-Trimethylbenzene	0.268	2.5	70-130%	< 20%
1,2,4,5-Tetramethylbenzene	0.097	2.0	70-130%	< 20%
1,3-Dichlorobenzene	0.186	2.5	70-130%	< 20%
1,3-Dichloropropane	0.212	2.5	70-130%	< 20%
1,3,5-Trimethylbenzene	0.211	2.5	70-130%	< 20%
1,4-Dichlorobenzene	0.215	2.5	70-130%	< 20%
1,4-Dichloro-2-butane	0.464	5.0	70-130%	< 20%
2-Butanone	1.94	5.0	70-130%	< 20%
2-Chloroethylvinyl ether	0.402	10.0	70-130%	< 20%
2-Chlorotoluene	0.182	2.5	70-130%	< 20%
2-Hexanone	0.578	5.0	70-130%	< 20%
2,2-Dichloropropane	0.397	2.5	70-130%	< 20%
4-Chlorotoluene	0.185	2.5	70-130%	< 20%
4-Ethyltoluene	0.416	2.0	70-130%	< 20%
4,-Methy-2-pentanone	0.416	5.0	70-130%	< 20%
Non-Standard Compounds				
Diisopropyl Ether	0.165	2.0	70-130%	< 20%
Ethyl-Tert-Butyl-Ether	0.460	2.0	70-130%	< 20%
Tertiary-Amyl Methyl Ether	0.382	2.0	70-130%	< 20%
1,4-Dioxane	75.7	250.0	70-130%	< 20%
Freon -113	0.234	10.0	70-130%	< 20%

Surrogates	% Recovery
dibromofluoromethane	70-130%
	70-130%
toluene-d8	70-130%
4-bromofluorobenzene	70-130%

* Elaine 2007, Quimby Con1/2 -2007, Jack Con1/2- 2008, Gonzo 2009, Bundy 2010 - Highest MDL

Alpha Analytical Inc.
Standard Reporting List
Westborough, MA

PCBs in soil EPA 8082				
Analytes	**MDL * ug/Kg**	**RL ug/Kg**	**LCS/MS % Rec**	**MS/MSD % RPD**
Aroclor 1016	6.58	33.3	40-140%	< 50%
Aroclor 1221	10.045	33.3		< 50%
Aroclor 1232	7.07	33.3		< 50%
Aroclor 1242	6.32	33.3		< 50%
Aroclor 1248	4.03	33.3		< 50%
Aroclor 1254	5.25	33.3		< 50%
Aroclor 1260	5.78	33.3	40-140%	< 50%
Aroclor 1262	2.46	33.3		< 50%
Aroclor 1268	4.83	33.3		< 50%

Surrogate(s)	% Recovery
2,4,5,6-Tetrachloro-m-xylene	30-150%
Decachlorobiphenyl	30-150%

* Pest 2 2009 , Pest 7 2008, Pest 9 2008,
Pest 12 2009 SOX & Microwave - Highest MDL

PCB's in Liquid EPA 8082				
Analytes	**MDL * ug/L**	**RL ug/L**	**LCS/MS % Rec**	**MS/MSD % RPD**
Aroclor 1016	0.0660	0.25	40-140%	< 30%
Aroclor 1221	0.0580	0.25		< 30%
Aroclor 1232	0.0370	0.25		< 30%
Aroclor 1242	0.0720	0.25		< 30%
Aroclor 1248	0.0670	0.25		< 30%
Aroclor 1254	0.0410	0.25		< 30%
Aroclor 1260	0.0380	0.25	40-140%	< 30%
Aroclor 1262	0.0350	0.25		< 30%
Aroclor 1268	0.0290	0.25		< 30%

Surrogate(s)	% Recovery
2,4,5,6-Tetrachloro-m-xylene	30-150%
Decachlorobiphenyl	30-150%

* Pest 7 2008, Pest 9 2008 - highest MDL

Soil Management Evaluation and Response Plan, Revision 1

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SOIL MANAGEMENT EVALUATION AND RESPONSE PLAN, REVISION 1

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1 INTRODUCTION

This Soil Management Evaluation and Response Plan, Revision 1 ("the SM Response Plan") summarizes the results of the November-December 2011 soil investigations on the W. R. Grace & Co - Conn. (Grace) property. The purpose of the investigations was to delineate the geographic area(s) containing soil with concentrations exceeding Record of Decision (ROD) (EPA, 1989) action levels. This report provides a description of the delineated geographic areas, and it also proposes appropriate response actions for those areas. The soil investigation work was conducted in accordance with the Soil Management Work Plan (Revision 1) (the "Work Plan"), (Tetra Tech GEO, 2011) which was updated to reflect Environmental Protection Agency (EPA) comments dated July 28, 2011 (EPA, 2011) and decisions made during a September 30, 2011 meeting between EPA, the Massachusetts Department of Environmental Protection (MassDEP) and Grace.

In accordance with the Work Plan, soil samples were collected for analysis from four areas of the property to verify and delineate the extent of soil contamination at locations where previous soil sample analyses indicated that ROD action levels were exceeded. In addition, soil samples were collected from one sampling location not proposed in the Work Plan, to evaluate the cPAH concentrations in a drainage basin. Section 2 of this SM Response Plan describes how the soil samples were collected and analyzed. Section 3 provides a summary of the areas that were investigated and the soil quality results from the soil samples collected in 2011. Section 4 proposes appropriate response actions for areas where soil concentrations exceed ROD action levels and Section 5 provides reference cited in this SM Response Plan. This SM Response Plan has been revised to reflect the May 21, 2012 Tetra Tech GEO letter to USEPA *RE: Response to USEPA Comments on the Soil Management Evaluation and Response Plan* (Tetra Tech GEO, 2012).

2 SAMPLING AND ANALYSIS PROCEDURES

This section describes how the soil samples were collected and analyzed.

2.1 SURVEYING

The EPA approved soil sampling locations SM-1 through SM-36 were located and staked by Meridian Associates prior to sample collection (Tetra Tech GEO, 2011). The location of soil sample location SM-37, which was not originally proposed in the Work Plan, was based on field observations. The location was not staked and surveyed in the field. The mapped position of the sampling location was approximated from the CAD site map.

Meridian Associates measured the ground surface elevation at locations SM-1 through SM-36. The ground surface elevations are included on the test pit and boring logs included in Attachment A. The ground surface elevation information from the locations in the south drainage ditch (SM-24 through SM-36) and the -filled portion of the south drainage ditch (SM-18 through SM-23) was used to estimate the elevation of the former surface of the now-filled south drainage ditch. This portion of the ditch was filled in during site development for the building additions and warehouse in the late 1960s and early 1970s. Based on the surveyed elevations, it was determined that samples collected from approximately 5 to 6 feet bgs represent the elevation of the former surface of the drainage ditch to a depth of approximately 1 foot below the former surface, and samples collected from approximately 7 to 8 feet bgs would represent an elevation approximately 2 to 3 feet below the former drainage ditch surface.

2.2 SOIL SAMPLING

The soil samples were collected between November 14, 2011 and December 19, 2011. Soil samples SM-18 through SM-23, were collected from between the former warehouse and 1974 building addition (ESC-13 Area). A sonic drill rig with a water-cooled outer casing was used to minimize heating of the samples and possible loss of volatile organic compounds (VOCs) from the samples. Soil samples from all other areas (SM-1 through 17 and SM-24 through SM-37) were collected from the sides of test pits dug with a small excavator. The soil samples were collected according to the procedures described in the Work Plan (Tetra Tech GEO, 2011). All excess soil generated by the borings and test pits was placed back in the boring/test pit, as specified in the Work Plan (Tetra Tech GEO, 2011). All field work was completed in accordance with the Health and Safety Plan for the Site (GeoTrans, 2010). Test pit and boring logs for SM-1 through SM-37 are included in Attachment A.

Representatives from EPA were on-site conducting oversight on behalf of EPA during most of the 2011 field work activities.

2.3 SAMPLE ANALYSIS

The soil samples were sent to Alpha Analytical for analysis. Table 2-1 summarizes the location, depth, number of soil samples and analytical methods for each of the five investigation areas of the Site. Detection limits were below ROD action levels for all parameters on all samples, except on a few samples where dilution was required due to elevated concentrations of ethyl acetate as discussed in Section 3. One equipment blank was collected for each analytical method and a trip blank was included in coolers containing VOC samples. No other quality assurance/quality control samples were collected. Tables 2-2 through 2-4 provide the results from the equipment blanks and trip blanks collected during the soil sampling. Table 2-2 shows the results for the one equipment blank and two trip blanks analyzed for VOCs, Table 2-3 shows the results for the two equipment blanks analyzed for PAHs and Table 2-4 shows the results for the two equipment blanks analyzed for PCBs. As shown in the tables, there were no issues with the equipment or trip blank results.

In order to assure that sample integrity was maintained, site sample labeling, chain-of-custody forms, and packing and shipping requirements for the project samples were handled according to the procedures described in the Work Plan (Tetra Tech GEO, 2011).

3 RESULTS OF SOIL SAMPLE ANALYSES

As discussed in Section 2 of the Work Plan (TT GEO, 2011) four geographic areas were identified for the soil delineation investigation. These areas were referred to as:

- Passivating Area Drain Line (SS-14 and SS-17)
- South Side of 1966 Building Addition (ECS-8)
- Between Former Warehouse and 1974 Building Addition (ECS-13)
- South Drainage Ditch (ECS-SS-1 and ECS-SS-2)

The soil investigation areas are shown on Figure 3-1. This section of the report summarizes the four areas investigated and the soil quality results from the soil samples collected from previous investigations and during 2011.

3.1 PASSIVATING AREA DRAIN LINE (SS-14 AND SS-17)

Results of Previous Investigations

Soil samples SS-14 and SS-17 were collected in 2006 from beneath corroded sections of the cast iron drain line beneath the former passivating area (Figure 3-1). Flow in the drain line was from the area of SS-17 toward SS-14. Soil sample SS-14 was collected at a depth of approximately 1.7 feet bgs and SS-17 at approximately 2.8 feet bgs. The PCB concentration in sample SS-17, collected beneath an elbow in the cast iron drain line, was 25,400 µg/Kg. The elbow directed flow from the passivating area floor trench drain into the drain line. The PCB concentration in SS-14 was 1,070J µg/Kg. The reported concentration in SS-14 was only slightly greater than the ROD action level of 1,040 µg/Kg. A duplicate sample collected at SS-14 had a PCB concentration of 65J µg/Kg,. The J qualifiers indicate that the reported concentrations are approximate. No other samples collected beneath the former passivating area drain line contained PCBs at concentrations exceeding ROD action levels.

2011 Results of Sample Analyses

In 2011, 24 soil samples were collected at locations SM-6 through SM-17 along and adjacent to the former passivating area drain line between sample locations SS-17 and ten feet beyond SS-14, as well as two samples from beneath the former trench drain that flowed into the passivating area drain line. Locations SS-14 and SS-17 were re-sampled and identified as SM-6 and SM-14, respectively. The sample locations are shown on Figure 3-2. To target the area beneath the former drain line, two soil samples were collected from each of the twelve locations: a sample of soil from approximately one to two feet bgs and a sample of soil from approximately three to four feet bgs. Test pit logs for SM-6 through SM-17 are included in Attachment A.

The soil samples were analyzed for PCBs using EPA Method 8082 with Microwave Extraction Method 3546. The PCB concentrations from the samples collected in 2011 are summarized in Table 3-1 and shown on Figure 3-2. The PCB concentration from the sample collected one to two feet bgs at SM-8 was 1,190 µg/Kg, slightly above the ROD action level of 1,040 µg/Kg. The PCB concentrations in the other 23 soil samples were below the ROD action level. The soil sampling results indicate that there is a small volume of soil with PCB concentrations that exceed the ROD action level in this area. The proposed response action for this area is discussed in Section 4.1.

3.2 SOUTH SIDE OF 1966 BUILDING ADDITION (ECS-8)

Results of Previous Investigations

The sample collected in 2006 from the depth interval of 1 to 3 feet from boring ECS-8 (Figure 3-1) contained TCE and PCE at concentrations of 292 and 115 µg/Kg, respectively. Photoionization detector (PID) field screening of the sample indicated a head-space concentration of 2 parts per million (ppm). PID field screening of the next deeper sample, 5 to 7 feet deep, did not detect any VOCs. No other soil samples, collected from above the water table at the Grace property contained VOC concentrations exceeding ROD action levels. The ECS-8 sample that contained TCE and PCE concentrations exceeding ROD action levels was located just below the former building floor slab. After ECS-8 was collected, the floor slab and building foundation were removed and the ground surface was re-graded such that the current ground surface at the location of ECS-8 is approximately two feet lower than it was at the time that ECS-8 was collected.

2011 Results of Sample Analyses

To determine if VOC-contaminated soil was still present in the area of ECS-8, shallow soil samples were collected at locations SM-1 through SM-5. Location ECS-8 was re-sampled and identified as SM-1. The locations are shown on Figure 3-3. Two soil samples were collected from each of the five locations, one at approximately 0.5 feet bgs and one approximately two feet bgs. The soil samples were collected using EnCore® Samplers and analyzed for VOCs using EPA Method 8260B with low-level detection limits. Test pit logs for SM-1 through SM-5 are included in Attachment A.

The VOC concentrations from the samples collected in 2011 are summarized in Table 3-2 and shown on Figure 3-3. Table 3-2 also summarizes the ROD action levels. No VOCs were detected in any of the 10 samples, and the detection limits were less than the ROD action levels, indicating that there is no longer VOC contamination in soil in this area. It is likely that any VOC contamination present in the soil in 2006 volatilized after the floor slab and building foundation were removed and is no longer present. No further action is needed in this area.

3.3 BETWEEN FORMER WAREHOUSE AND 1974 BUILDING ADDITION (ECS-13)

Results of Previous Investigations

The PCB concentration of the sample collected in 2005 at a depth between 5 and 7 feet from boring ECS-13 was 1,110 μg/Kg, slightly higher than the ROD action level of 1,040 μg/Kg. Boring ECS-13 was drilled in a filled portion of the south drainage ditch near the former discharge of the roof drainage system (Figure 3-1). The roof drainage discharge pipe was moved further east when the 1974 addition to the building was built.

2011 Results of Sampling Analyses

In 2011, 12 soil samples were collected at locations SM-18 through SM-23 to delineate the soil PCB concentrations in the filled portion of the south drainage ditch. In addition, because VOC detection limits of the previous soil sample analyses from this location were greater than the ROD action levels, soil samples collected from this area in 2011 were also analyzed for VOCs. Location ECS-13 was re-sampled and identified as SM-20. The sample locations are shown on Figure 3-4. At each of the six locations, two samples were collected, one from approximately 5 to 6 feet bgs and one from approximately 7 to 8 feet bgs. As discussed in Section 2.1, it was determined that these depths represent the former surface of the drainage ditch to a depth of approximately 1 foot below the former surface and approximately 2 to 3 feet below the former drainage ditch surface. Boring logs for SM-18 through SM-23 are included in Attachment A.

The samples were analyzed for PCBs using EPA Method 8082 with Microwave Extraction Method 3546. The PCB concentrations from the samples collected in 2011 are summarized in Table 3-1 and shown on Figure 3-4. The PCB concentrations of three samples (5.7 to 6 feet bgs and 7 to 7.3 feet bgs at SM-19 and 7.7 to 8 feet bgs at SM-21) exceeded the ROD action level of 1,040 µg/Kg. The PCB concentrations in these three samples ranged between 2,640 µg/Kg and 15,900 µg/Kg. The PCB concentrations in the other nine soil samples were below the ROD action level. The soil sampling analyses indicate that there is a small volume of soil that exceeds the PCB ROD action level in this area. The proposed response action for this area is discussed in Section 4.2.

Soil samples were analyzed for VOCs using EPA Method 8260B with low-level detection limits. The VOC concentrations of the samples collected in 2011 are summarized in Table 3-2 and shown on Figure 3-5. To minimize possible volatilization caused by heat generated by drilling, these samples were collected using a sonic drill rig with a water cooled outer barrel. The VOC soil samples were collected using EnCore® Samplers. In addition, the temperature of the soil samples was measured as soon as the sample was removed from the core barrel. As shown on the boring logs, the temperature of the samples were between 55°F and 60°F, indicating minimal heating of the samples. VOC concentrations in the soil samples collected from this area did not exceed ROD action levels, however, two samples were diluted due to the presence of ethyl acetate, resulting in their detection limits exceeding ROD action levels for several VOCs. The two samples with elevated VOC detection limits (SM-19 7 to 7.3 feet bgs and SM-21 7.7 to 8 feet) were collected from locations that had PCB concentrations greater than the ROD action level, and will therefore be included in a response action which is discussed in Section 4.2.

3.4 SOUTH DRAINAGE DITCH (ECS-SS-1 AND ECS-SS-2)

Results of Previous Investigations

The samples ECS-SS-1 and ECS-SS-2 (Figure 3-1) were collected in 2005 from the south drainage ditch to assess the presence/absence of surficial soil contamination associated with potential run-off from the Grace building and the site drainage system to the drainage ditch. These two samples contained cPAHs at concentrations exceeding the ROD action level.

2011 Results of Sample Analyses

In 2011, 22 soil samples were collected at locations SM-24 through SM-36 to delineate the cPAH concentrations within the south drainage ditch. Location ECS-SS-1 was re-sampled and identified as SM-26, and location ECS-SS-2 was re-sampled and identified as SM-30. The sample locations are shown on Figure 3-4. Two soil samples were collected at each of the nine locations along the bottom of the draining ditch: a sample from approximately 0.5 to 1.5 bgs and a sample from approximately 2 to 3 feet bgs. At the four locations along the side of the drainage ditch, one soil sample was collected from a depth of approximately 0.5 bgs. Test pit logs for SM-24 through SM-36 are included in Attachment A.

The samples were analyzed for PAHs using EPA Method 8270CSIM. The PAH concentrations of the samples collected in 2011 are summarized in Table 3-3 and shown on Figure 3-6. The cPAH concentrations from seven of the samples exceeded the ROD action level of 690 µg/Kg. The cPAH concentrations in these samples ranged between 764 µg/Kg and 3,930 µg/Kg. In addition, one sample, SM-26 at 0.5 to 1.5 feet bgs, was diluted, resulting in non-detect results at detection limits exceeding the ROD action level. As shown on Figure 3-6, cPAH concentrations exceeding the ROD action level are mainly limited to the upper 1.5 to two feet of soil along the center of the south drainage ditch. Concentrations of cPAHs in samples collected along the side of the drainage ditch and from a depth of 2 to 3 feet below the center of the drainage ditch were below the ROD action level, with one exception. The deeper sample at SM-32 had a cPAH concentration of 764 µg/Kg. The SM-32 location is adjacent to an area where a drain line effluent enters the south drainage ditch from the south. The drain line, a corrugated culvert, was installed in 1992 during construction of the Groundwater Treatment System.

To evaluate if there were cPAH within the basin located at the upgradient end of the drain line (influent end) entering the south drainage ditch at location SM-32, soil samples from two depth intervals were collected from one location (SM-37) within the basin area and adjacent to the influent end of the drain line. Concentrations of cPAHs in the two SM-37 soil samples were below the ROD action level. The low concentrations of cPAHs from the two samples at the upstream end of the culvert (SM-37) show that this drainage swale and culvert are not the source of PAHs found at SM-32. The elevated PAH soil in the SM-32 location is likely due to water accumulation in the low area of the south drainage ditch adjacent to its intersection with the culvert. Figure 3-6 shows the location and cPAH concentrations for location SM-37. In addition, the cPAH concentrations are summarized in Table 3-3. A test pit log for SM-37 is included in Attachment A.

The results of soil sample analyses indicate that the surficial soil along the center of the south drainage ditch exceeds the cPAH ROD action level. The proposed response action for this area is discussed in Section 4.3. No further action is considered necessary in the basin where sample SM-37 was collected.

4 PROPOSED SOIL RESPONSE PLAN

Based on the 2011 soil investigations we recommend that response actions be implemented to address soil with concentrations exceeding ROD action levels in three areas of the Site. Grace proposes to excavate soil with concentrations exceeding ROD action levels, conduct confirmatory sampling where necessary, dispose of the soil off-Site and prepare a Soil Response Action Completion Report. The proposed work is discussed below.

4.1 EXCAVATION

Grace proposes to excavate soil exceeding ROD action levels in three areas as described below. Each area proposed for excavation will be surveyed and marked out prior to beginning excavation.

4.1.1 PASSIVATING AREA DRAIN LINE (SS-14 AND SS-17)

Grace proposes to excavate the soil to a depth of three feet in two areas, “A” and “B”, along the passivating area drain line. The limits of the two proposed excavations are shown on Figure 3-2. A total of approximately 9.5 cubic yards of soil will be excavated and disposed of off-Site. Based on data from samples collected in 2011, specifically from locations SM-11, SM-12, SM-13, SM-14, SM-15, and SM-16, the eastern, western, northern and southern limits in this area are well defined. No additional post excavation sampling is proposed for this area as none of the twelve samples collected in 2011 from the six locations surrounding SS-17 exceeded the ROD action level.

The eastern limits of excavation “B” are well defined by the data from samples collected at SM-6, SM-7, and SM-9 and therefore no post-excavation confirmatory sampling is proposed. The western limits of excavation “B”, west of sample location SM-8, will be confirmed by post-excavation confirmatory soil samples collected from the southwestern, western and northern sides of the excavation “B”. The confirmatory samples will be collected at a depth of 1 to 2 feet. The confirmatory sample locations are shown on Figure 3-2. The confirmatory soil samples will be analyzed for PCBs using EPA Method 8082 with Microwave Extraction Method 3546. If the confirmatory soil PCB concentrations are below the ROD action level, the remedial action for this area will be considered complete. If the PCB concentration of any confirmatory soil sample exceeds the ROD action level, excavation will continue two feet beyond the confirmatory sample location and additional confirmatory sample(s) will be collected. This proposed post-excavation confirmatory sampling process will continue until soil PCB concentrations are below the ROD action level. Following completion of excavation of these areas, the excavations will be backfilled with imported fill. The fill will be from a certified clean source and tested prior to being brought onto the Site.

4.1.2 BETWEEN FORMER WAREHOUSE AND 1974 BUILDING ADDITION (ECS-13)

To remove soil containing PCB concentrations greater than the ROD action levels Grace proposes to excavate the soil from the area shown on Figure 3-4. The proposed depth of the excavation is ten feet. Excavation will be done during what is expected to be the seasonal low water table, which is estimated to be approximately 10 to 11 feet bgs. Soil below the seasonal low water table will not be excavated, as the soil remedy is targeted at limiting contact with contaminated soil and contact is unlikely below the water table. If necessary, any water accumulation in the bottom of the excavation will be pumped into a temporary holding tank and processed through the Grace on-site Treatment System.

Approximately 37 cubic yards of soil will be excavated, from the ECS-13 area, and disposed of off-Site. Post-excavation confirmatory soil samples are proposed to be collected from four locations on the sides of the excavation and from two locations in the bottom of the excavation. The confirmatory sample locations are shown on Figure 3-4. Two samples will be collected from each of the four side locations, one between 5 and 8 feet bgs, as specified in Table 4-1, and one at the base of the excavation at a depth of approximately 10 feet bgs. Two samples will be collected from the bottom of the excavation at the approximate locations of SM-19 and SM-21. The confirmatory soil samples will be analyzed for PCBs using EPA Method 8082 with Microwave Extraction Method 3546. Because the detection limits from one VOC sample collected at SM-19 and one VOC sample collected at SM-21 exceeded ROD action levels, the confirmatory samples will also be analyzed for VOCs using EPA Method 8260B with low-level detection limits. If the confirmatory sample PCB and VOC concentrations are below ROD action levels, remedial action for this area will be considered complete. If any confirmatory soil sample concentrations exceed ROD action levels, excavation will continue beyond that sample location by two feet and additional confirmatory samples will be collected until soil PCB and VOC concentrations are below the ROD action level. Following completion of excavation of this area, the excavation will be backfilled with imported fill. The fill will be from a certified clean source and tested prior to being brought onto the Site.

4.1.3 South Drainage Ditch (ECS-SS-1 and ECS-SS-2)

The south drainage ditch is heavily vegetated. Therefore, trees and vegetation will be removed from the ditch prior to excavation. The trees and vegetation will be chipped and spread on-site. Tree roots and vegetative matter mixed with soil will be sent off-site for disposal with the soil material. Appropriate erosion and sedimentation controls will be placed at the downstream end of the drainage ditch during construction.

To remove the soil containing cPAHs at concentrations greater than the ROD action levels, Grace proposes to excavate the soil to a depth of two feet along the center line of the south drainage ditch as shown on Figure 3-6. In addition, the area around location SM-32 is proposed to be excavated to a depth of four feet. It is estimated that approximately 100 cubic yards of soil will be excavated and disposed of off-Site. Post-excavation confirmatory soil samples are proposed to be collected from three locations on the west end of the excavation near SM-24, where the former roof drain entered the ditch, from four locations near SM-32 and from four locations on the side of the ditch. The confirmatory sample locations are shown on Figure 3-6. One sample will be collected from each of the three locations at the west end of the excavation at a depth of 0.5 to 1.5 feet. A total of seven samples will be collected from the area of SM-32. At each of the locations east, west and south of SM-32, one sample will be collected at a depth of 0.5 to 1.5 feet and one will be collected at the bottom of the excavation at a depth of approximately four feet bgs. In addition, one sample will be collected from the bottom of the excavation in the location of SM-32 at a depth of approximately four feet bgs. Finally, four lateral (side wall) samples will be collected along the ditch adjacent to locations SM-28 and SM-35. These samples will be collected at a depth of 0.5 to 1.5 feet. The confirmatory soil samples will be analyzed for PAHs using EPA Method 8270CSIM. If the confirmatory soil sample cPAH concentrations are below ROD action levels, remedial action for this area will be considered complete. If any confirmatory soil sample cPAH concentrations exceed ROD action levels, excavation will continue by two feet beyond that sample location and additional confirmatory samples will be collected. Following completion of excavation of this area, clean fill and rip-rap stone will be brought in to restore the ditch to its original elevation and configuration.

4.2 CONFIRMATORY SOIL SAMPLING

Confirmatory soil samples will be collected from the sides or bottom of the excavation at the locations described above. The soil samples will be collected and analyzed according to the procedures described in the Work Plan (Tetra Tech GEO, 2011). The samples will be analyzed with quick turn-around times so the results of analyses will be available before the excavation equipment demobilizes from the Site. Table 4-1 summarizes the number, depths and analyses of the proposed confirmatory soil samples.

4.3 SOIL DISPOSAL

Necessary waste profiles will be prepared, based on the existing data, and disposal facilities will be selected. EPA will be provided with the names and location of the disposal facilities prior to any off-site shipment of impacted material.

4.4 SOIL RESPONSE ACTION COMPLETION REPORT

Following completion of the soil remedial action, a Soil Response Action and Completion Report will be prepared and submitted to EPA. The report will summarize the soil excavation and confirmatory soil sample results.

4.5 SCHEDULE

The soil excavation and sampling described in this SM Response Plan is expected to be completed in the summer of 2012, weather permitting, assuming prompt EPA approval of the response plan. A project schedule for the proposed activities will be provided upon EPA approval of the SM Response Plan.

5 REFERENCES

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TABLES

TABLE 2-1. SUMMARY OF SOIL SAMPLING LOCATIONS, DEPTHS AND ANALYSES

Locations	Sample Depths	Number of Samples	Analysis
Passivating Area Drain Line: SM-6 through SM-17 (SM-14 collected at historic location SS-17; SM-6 collected at historic location SS-14)	1-2 & 3-4 feet bgs	24	PCBs by EPA Method 8082 with Microwave Extraction Method 3546
South Side of 1966 Building Addition: SM-1 through SM-5 (SM-1 collected at historic location ECS-8)	0.5 & 2 feet bgs	10	VOCs by EPA Method 8260B with low-level detection limits
Between Former Warehouse and 1974 Building Addition: SM-18 through SM-23 (SM-20 collected at historic location ECS-13)	~5-6 & ~7-8 feet bgs	12	PCBs by EPA Method 8082 with Microwave Extraction Method 3546; VOCs by EPA Method 8260B with low-level detection limits
South Drainage Ditch: SM-24 through SM-36 (SM-26 collected at historic location ECS-SS-1; SM-30 collected at historic location ECS-SS-2)	0.5-1.5 & 2-3 feet bgs at each of 9 locations; 0.5-1.5 feet bgs at each of 4 locations	22	cPAHs by EPA Method 8270CSIM
Basin: SM-37	0.5-1.5 & 2-3 feet bgs	2	cPAHs by EPA Method 8270CSIM

Table 2-2. Summary of 2011 VOC Equipment and Trip Blank Results Related to Soil Sampling.

Type	Equipment Blank	Trip Blank	Trip Blank
Field Sample ID	SM-21-TEB	TB-111611-SM	TB-112911
Date	11/29/11	11/16/11	11/29/11
1,1,1,2-Tetrachloroethane	ND (0.50)	ND (0.50)	ND (0.50)
1,1,1-Trichloroethane	ND (0.50)	ND (0.50)	ND (0.50)
1,1,2,2-Tetrachloroethane	ND (0.50)	ND (0.50)	ND (0.50)
1,1,2-Trichloroethane	ND (0.75)	ND (0.75)	ND (0.75)
1,1,2-trichlorotrifluoroethane	ND (10)	ND (10)	ND (10)
1,1-Dichloroethane	ND (0.75)	ND (0.75)	ND (0.75)
1,1-Dichloroethene	ND (0.50)	ND (0.50)	ND (0.50)
1,1-Dichloropropene	ND (2.5)	ND (2.5)	ND (2.5)
1,2,3-Trichlorobenzene	ND (2.5)	ND (2.5)	ND (2.5)
1,2,3-Trichloropropane	ND (5.0)	ND (5.0)	ND (5.0)
1,2,4,5-Tetramethylbenzene	ND (2.0)	ND (2.0)	ND (2.0)
1,2,4-Trichlorobenzene	ND (2.5)	ND (2.5)	ND (2.5)
1,2,4-Trimethylbenzene	ND (2.5)	ND (2.5)	ND (2.5)
1,2-Dibromo-3-chloropropane	ND (2.5)	ND (2.5)	ND (2.5)
1,2-Dibromoethane	ND (2.0)	ND (2.0)	ND (2.0)
1,2-Dichlorobenzene	ND (2.5)	ND (2.5)	ND (2.5)
1,2-Dichloroethane	ND (0.50)	ND (0.50)	ND (0.50)
1,2-Dichloropropane	ND (1.8)	ND (1.8)	ND (1.8)
1,3,5-Trimethylbenzene	ND (2.5)	ND (2.5)	ND (2.5)
1,3-Dichlorobenzene	ND (2.5)	ND (2.5)	ND (2.5)
1,3-Dichloropropane	ND (2.5)	ND (2.5)	ND (2.5)
1,4-Dichlorobenzene	ND (2.5)	ND (2.5)	ND (2.5)
1,4-Dichlorobutane	ND (5.0)	ND (5.0)	ND (5.0)
1,4-Dioxane	ND (250)	ND (250)	ND (250)
2,2-Dichloropropane	ND (2.5)	ND (2.5)	ND (2.5)
2-Butanone	ND (5.0)	ND (5.0)	ND (5.0)
2-Chloroethylvinyl ether	ND (10)	ND (10)	ND (10)
2-Hexanone	ND (5.0)	ND (5.0)	ND (5.0)
4-Ethyltoluene	ND (2.0)	ND (2.0)	ND (2.0)
4-Methyl-2-pentanone	ND (5.0)	ND (5.0)	ND (5.0)
Acetone	ND (5.0)	ND (5.0)	ND (5.0)
Acrylonitrile	ND (5.0)	ND (5.0)	ND (5.0)
Benzene	ND (0.50)	ND (0.50)	ND (0.50)
Bromobenzene	ND (2.5)	ND (2.5)	ND (2.5)
Bromochloromethane	ND (2.5)	ND (2.5)	ND (2.5)
Bromodichloromethane	ND (0.50)	ND (0.50)	ND (0.50)
Bromoform	ND (2.0)	ND (2.0)	ND (2.0)
Bromomethane	ND (1.0)	ND (1.0)	ND (1.0)
Carbon disulfide	ND (5.0)	ND (5.0)	ND (5.0)
Carbon tetrachloride	ND (0.50)	ND (0.50)	ND (0.50)
Chlorobenzene	ND (0.50)	ND (0.50)	ND (0.50)
Chloroethane	ND (1.0)	ND (1.0)	ND (1.0)
Chloroform	1.5	0.91	0.88
Chloromethane	ND (2.5)	ND (2.5)	ND (2.5)
cis-1,2-Dichloroethene	ND (0.50)	ND (0.50)	ND (0.50)
cis-1,3-Dichloropropene	ND (0.50)	ND (0.50)	ND (0.50)
Cyclohexane	ND (10)	ND (10)	ND (10)
Dibromochloromethane	ND (0.50)	ND (0.50)	ND (0.50)
Dibromomethane	ND (5.0)	ND (5.0)	ND (5.0)
Dichlorodifluoromethane	ND (5.0)	ND (5.0)	ND (5.0)
Ethyl Acetate	ND (10)	ND (10)	ND (10)
Ethyl ether	ND (2.5)	ND (2.5)	ND (2.5)
Ethyl methacrylate	ND (5.0)	ND (5.0)	ND (5.0)
Ethylbenzene	ND (0.50)	ND (0.50)	ND (0.50)
Ethyl-Tert-Butyl-Ether	ND (2.0)	ND (2.0)	ND (2.0)

Table 2-2. Summary of 2011 VOC Equipment and Trip Blank Results Related to Soil Sampling.

Type	Equipment Blank	Trip Blank	Trip Blank
Field Sample ID	SM-21-TEB	TB-111611-SM	TB-112911
Date	11/29/11	11/16/11	11/29/11
Hexachlorobutadiene	ND (0.50)	ND (0.50)	ND (0.50)
Isopropyl Ether	ND (2.0)	ND (2.0)	ND (2.0)
Isopropylbenzene	ND (0.50)	ND (0.50)	ND (0.50)
Methyl cyclohexane	ND (10)	ND (10)	ND (10)
Methyl tert butyl ether	ND (1.0)	ND (1.0)	ND (1.0)
Methylene chloride	ND (3.0)	ND (3.0)	ND (3.0)
Naphthalene	ND (2.5)	ND (2.5)	ND (2.5)
n-Butylbenzene	ND (0.50)	ND (0.50)	ND (0.50)
n-Propylbenzene	ND (0.50)	ND (0.50)	ND (0.50)
o-Chlorotoluene	ND (2.5)	ND (2.5)	ND (2.5)
o-Xylene	ND (1.0)	ND (1.0)	ND (1.0)
p/m-Xylene	ND (1.0)	ND (1.0)	ND (1.0)
p-Chlorotoluene	ND (2.5)	ND (2.5)	ND (2.5)
p-Diethylbenzene	ND (2.0)	ND (2.0)	ND (2.0)
p-Isopropyltoluene	ND (0.50)	ND (0.50)	ND (0.50)
sec-Butylbenzene	ND (0.50)	ND (0.50)	ND (0.50)
Styrene	ND (1.0)	ND (1.0)	ND (1.0)
Tert-Butyl Alcohol	ND (10)	ND (10)	ND (10)
tert-Butylbenzene	ND (2.5)	ND (2.5)	ND (2.5)
Tertiary-Amyl Methyl Ether	ND (2.0)	ND (2.0)	ND (2.0)
Tetrachloroethene	ND (0.50)	ND (0.50)	ND (0.50)
Tetrahydrofuran	ND (5.0)	ND (5.0)	ND (5.0)
Toluene	ND (0.75)	ND (0.75)	ND (0.75)
trans-1,2-Dichloroethene	ND (0.75)	ND (0.75)	ND (0.75)
trans-1,3-Dichloropropene	ND (0.50)	ND (0.50)	ND (0.50)
trans-1,4-Dichloro-2-butene	ND (2.5)	ND (2.5)	ND (2.5)
Trichloroethene	ND (0.50)	ND (0.50)	ND (0.50)
Trichlorofluoromethane	ND (2.5)	ND (2.5)	ND (2.5)
Vinyl acetate	ND (5.0)	ND (5.0)	ND (5.0)
Vinyl chloride	ND (1.0)	ND (1.0)	ND (1.0)

Concentrations in µg/L.
ND (0.50) - not detected at detection limit indicated in parentheses.

Table 2-3. Summary of 2011 PAH Equipment Blank Results Related to Soil Sampling.

Type	Equipment Blank	Equipment Blank
Field Sample ID	SM-30-BEB	SM-30-TEB
Date	11/15/11	11/15/11
1-Methylnaphthalene	ND (0.20)	ND (0.20)
2-Chloronaphthalene	ND (0.20)	ND (0.20)
2-Methylnaphthalene	ND (0.20)	ND (0.20)
Acenaphthene	ND (0.20)	ND (0.20)
Acenaphthylene	ND (0.20)	ND (0.20)
Anthracene	ND (0.20)	ND (0.20)
Benzo(a)anthracene	ND (0.20)	ND (0.20)
Benzo(a)pyrene	ND (0.20)	ND (0.20)
Benzo(b)fluoranthene	ND (0.20)	ND (0.20)
Benzo(ghi)perylene	ND (0.20)	ND (0.20)
Benzo(k)fluoranthene	ND (0.20)	ND (0.20)
Chrysene	ND (0.20)	ND (0.20)
Dibenzo(a,h)anthracene	ND (0.20)	ND (0.20)
Fluoranthene	ND (0.20)	ND (0.20)
Fluorene	ND (0.20)	ND (0.20)
Hexachlorobenzene	ND (0.80)	ND (0.80)
Hexachlorobutadiene	ND (0.50)	ND (0.50)
Hexachloroethane	ND (0.80)	ND (0.80)
Indeno(1,2,3-c,d)pyrene	ND (0.20)	ND (0.20)
Naphthalene	ND (0.20)	ND (0.20)
Pentachlorophenol	ND (0.80)	ND (0.80)
Phenanthrene	ND (0.20)	ND (0.20)
Pyrene	ND (0.20)	ND (0.20)

Concentrations in µg/L.
ND (0.50) - not detected at detection limit indicated in parentheses.

Table 2-4. Summary of 2011 PCB Equipment Blank Results Related to Soil Sampling.

Type	Equipment Blank	Equipment Blank
Field Sample ID	SM-15-BEB	SM-15-TEB
Date	11/14/11	11/14/11
Aroclor 1016	ND (0.263)	ND (0.263)
Aroclor 1221	ND (0.263)	ND (0.263)
Aroclor 1232	ND (0.263)	ND (0.263)
Aroclor 1242	ND (0.263)	ND (0.263)
Aroclor 1248	ND (0.263)	ND (0.263)
Aroclor 1254	ND (0.263)	ND (0.263)
Aroclor 1260	ND (0.263)	ND (0.263)
Aroclor 1262	ND (0.263)	ND (0.263)
Aroclor 1268	ND (0.263)	ND (0.263)

Concentrations in µg/L.

ND (0.50) - not detected at detection limit indicated in parentheses.

Table 3-1. Summary of 2011 PCB Soil Sample Results.

Location	SM-6	SM-6	SM-7	SM-7	SM-8	SM-8	SM-9	SM-9	SM-10	SM-10	SM-11	SM-11
Date	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**
Depth (feet below ground surface)	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**
Aroclor 1016	ND (21.7)	ND (22.5)	ND (22.4)	ND (20.8)	ND (110)	ND (22.6)	ND (21.4)	ND (23.0)	ND (22.1)	ND (22.8)	ND (21.1)	ND (22.8)
Aroclor 1221	ND (21.7)	ND (22.5)	ND (22.4)	ND (20.8)	ND (110)	ND (22.6)	ND (21.4)	ND (23.0)	ND (22.1)	ND (22.8)	ND (21.1)	ND (22.8)
Aroclor 1232	ND (21.7)	ND (22.5)	ND (22.4)	ND (20.8)	ND (110)	ND (22.6)	ND (21.4)	ND (23.0)	ND (22.1)	ND (22.8)	ND (21.1)	ND (22.8)
Aroclor 1242	ND (21.7)	ND (22.5)	ND (22.4)	ND (20.8)	ND (110)	ND (22.6)	ND (21.4)	ND (23.0)	ND (22.1)	ND (22.8)	ND (21.1)	ND (22.8)
Aroclor 1248	ND (14.5)	ND (15.0)	ND (14.9)	ND (13.9)	ND (73.7)	ND (15.1)	ND (14.3)	ND (15.4)	ND (14.7)	ND (15.2)	ND (14.0)	ND (15.2)
Aroclor 1254	100	61.4	129	114	1190	50.5	194	30.4	103	68.5	49.4	ND (22.8)
Aroclor 1260	ND (14.5)	ND (15.0)	ND (14.9)	ND (13.9)	ND (73.7)	ND (15.1)	ND (14.3)	ND (15.4)	ND (14.7)	ND (15.2)	ND (14.0)	ND (15.2)
Aroclor 1262	ND (7.24)	ND (7.52)	ND (7.47)	ND (6.93)	ND (36.9)	ND (7.55)	ND (7.13)	ND (7.68)	ND (7.36)	ND (7.58)	ND (7.02)	ND (7.60)
Aroclor 1268	ND (7.24)	ND (7.52)	ND (7.47)	ND (6.93)	ND (36.9)	ND (7.55)	ND (7.13)	ND (7.68)	ND (7.36)	ND (7.58)	ND (7.02)	ND (7.60)

Table 3-1. Summary of 2011 PCB Soil Sample Results.

Location	**SM-12**	**SM-12**	**SM-13**	**SM-13**	**SM-14**	**SM-14**	**SM-15**	**SM-15**	**SM-16**	**SM-16**	**SM-17**	**SM-17**
Date	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**	**11/14/11**
Depth (feet below ground surface)	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**	**1-2**	**3-4**
Aroclor 1016	ND (21.2)	ND (22.8)	ND (21.8)	ND (22.0)	ND (21.8)	ND (22.2)	ND (21.7)	ND (24.3)	ND (21.7)	ND (22.9)	ND (21.3)	ND (25.4)
Aroclor 1221	ND (21.2)	ND (22.8)	ND (21.8)	ND (22.0)	ND (21.8)	ND (22.2)	ND (21.7)	ND (24.3)	ND (21.7)	ND (22.9)	ND (21.3)	ND (25.4)
Aroclor 1232	ND (21.2)	ND (22.8)	ND (21.8)	ND (22.0)	ND (21.8)	ND (22.2)	ND (21.7)	ND (24.3)	ND (21.7)	ND (22.9)	ND (21.3)	ND (25.4)
Aroclor 1242	ND (21.2)	ND (22.8)	ND (21.8)	ND (22.0)	ND (21.8)	ND (22.2)	ND (21.7)	ND (24.3)	ND (21.7)	ND (22.9)	ND (21.3)	ND (25.4)
Aroclor 1248	ND (14.1)	ND (15.2)	ND (14.5)	ND (14.7)	ND (14.6)	ND (14.8)	ND (14.5)	ND (16.2)	ND (14.4)	ND (15.3)	ND (14.2)	ND (16.9)
Aroclor 1254	24.9	ND (22.8)	48.6	200	204	124	523	ND (24.3)	36.0	ND (22.9)	ND (21.3)	ND (25.4)
Aroclor 1260	ND (14.1)	ND (15.2)	ND (14.5)	ND (14.7)	ND (14.6)	ND (14.8)	ND (14.5)	ND (16.2)	ND (14.4)	ND (15.3)	ND (14.2)	ND (16.9)
Aroclor 1262	ND (7.06)	ND (7.61)	ND (7.26)	ND (7.34)	ND (7.29)	ND (7.39)	ND (7.24)	ND (8.09)	ND (7.22)	ND (7.64)	ND (7.11)	ND (8.46)
Aroclor 1268	ND (7.06)	ND (7.61)	ND (7.26)	ND (7.34)	ND (7.29)	ND (7.39)	ND (7.24)	ND (8.09)	ND (7.22)	ND (7.64)	ND (7.11)	ND (8.46)

Table 3-1. Summary of 2011 PCB Soil Sample Results.

Location	SM-18	SM-18	SM-19	SM-19	SM-20	SM-20	SM-21	SM-21	SM-22	SM-22	SM-23	SM-23
Date	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**
Depth (feet below ground surface)	**5-5.5**	**7-7.3**	**5.7-6**	**7-7.3**	**5.7-6**	**7-7.3**	**5-5.3**	**7.7-8**	**5.7-6**	**7-7.3**	**5-5.3**	**7-7.3**
Aroclor 1016	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)
Aroclor 1221	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)
Aroclor 1232	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)
Aroclor 1242	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)
Aroclor 1248	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)
Aroclor 1254	ND (36.6)	ND (35.5)	2800	2640	928	71.2	ND (34.4)	15900	435	ND (35.9)	200	ND (38.9)
Aroclor 1260	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)
Aroclor 1262	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)
Aroclor 1268	ND (36.6)	ND (35.5)	ND (375)	ND (361)	ND (362)	ND (36.3)	ND (34.4)	ND (1850)	ND (38.1)	ND (35.9)	ND (37.2)	ND (38.9)

Concentrations in µg/kg
ND (22.8) - Not detected at detection limit indicated in parentheses.
Shaded - PCB concentration exceeds target soil concentration of 1040 µg/kg.

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-1	SM-1	SM-2	SM-2	SM-3	SM-3
Date		11/16/11	11/16/11	11/16/11	11/16/11	11/16/11	11/16/11
Depth (feet below ground surface)		0.5	2	0.5	2	0.5	2
1,1,1,2-Tetrachloroethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,1,1-Trichloroethane	613	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,1,2,2-Tetrachloroethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,1,2-Trichloroethane	-	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.7)
1,1,2-trichlorotrifluoroethane	-	ND (21)	ND (22)	ND (22)	ND (22)	ND (22)	ND (22)
1,1-Dichloroethane	-	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.7)
1,1-Dichloroethene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,1-Dichloropropene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,2,3-Trichlorobenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,2,3-Trichloropropane	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
1,2,4,5-Tetramethylbenzene	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
1,2,4-Trichlorobenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,2,4-Trimethylbenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,2-Dibromo-3-chloropropane	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,2-Dibromoethane	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
1,2-Dichlorobenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,2-Dichloroethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
1,2-Dichloropropane	-	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.8)	ND (3.9)
1,3,5-Trimethylbenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,3-Dichlorobenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,3-Dichloropropane	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,4-Dichlorobenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
1,4-Dioxane	-	ND (110)	ND (110)	ND (110)	ND (110)	ND (110)	ND (110)
2,2-Dichloropropane	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
2-Butanone	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
2-Chloroethylvinyl ether	-	ND (21)	ND (22)	ND (22)	ND (22)	ND (22)	ND (22)
2-Hexanone	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
4-Ethyltoluene	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
4-Methyl-2-pentanone	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
Acetone	-	ND (38)	ND (40)	ND (40)	ND (39)	ND (40)	ND (40)
Acrylonitrile	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
Benzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Bromobenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
Bromochloromethane	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
Bromodichloromethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Bromoform	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
Bromomethane	-	ND (2.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)
Carbon disulfide	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
Carbon tetrachloride	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Chlorobenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Chloroethane	-	ND (2.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)
Chloroform	63	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.7)
Chloromethane	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
cis-1,2-Dichloroethene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
cis-1,3-Dichloropropene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Cyclohexane	-	ND (21)	ND (22)	ND (22)	ND (22)	ND (22)	ND (22)
Dibromochloromethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Dibromomethane	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
Dichlorodifluoromethane	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
Ethyl Acetate	-	ND (21)	ND (22)	ND (22)	ND (22)	ND (22)	ND (22)
Ethyl ether	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
Ethyl methacrylate	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
Ethylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-1	SM-1	SM-2	SM-2	SM-3	SM-3
Date		11/16/11	11/16/11	11/16/11	11/16/11	11/16/11	11/16/11
Depth (feet below ground surface)		0.5	2	0.5	2	0.5	2
Ethyl-Tert-Butyl-Ether	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
Hexachlorobutadiene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
Isopropyl Ether	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
Isopropylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Methyl Acetate	-	ND (21)	ND (22)	ND (22)	ND (22)	ND (22)	ND (22)
Methyl cyclohexane	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
Methyl tert butyl ether	-	ND (2.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)
Methylene chloride	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
Naphthalene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
n-Butylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
n-Propylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
o-Chlorotoluene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
o-Xylene	-	ND (2.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)
p/m-Xylene	-	ND (2.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)
p-Chlorotoluene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
p-Diethylbenzene	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
p-Isopropyltoluene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
sec-Butylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Styrene	-	ND (2.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)
Tert-Butyl Alcohol	-	ND (110)	ND (110)	ND (110)	ND (110)	ND (110)	ND (110)
tert-Butylbenzene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
Tertiary-Amyl Methyl Ether	-	ND (4.3)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)	ND (4.4)
Tetrachloroethene	37	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Tetrahydrofuran	-	ND (21)	ND (22)	ND (22)	ND (22)	ND (22)	ND (22)
Toluene	-	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.7)
trans-1,2-Dichloroethene	83	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.6)	ND (1.7)
trans-1,3-Dichloropropene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
trans-1,4-Dichloro-2-butene	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
Trichloroethene	13	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.1)
Trichlorofluoromethane	-	ND (5.4)	ND (5.5)	ND (5.5)	ND (5.4)	ND (5.5)	ND (5.6)
Vinyl acetate	-	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)	ND (11)
Vinyl chloride	-	ND (2.1)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)	ND (2.2)

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-4	SM-4	SM-5	SM-5	SM-18	SM-18
Date		11/16/11	11/16/11	11/16/11	11/16/11	11/29/11	11/29/11
Depth (feet below ground surface)		0.5	2	0.5	2	5-5.5	7-7.3
1,1,1,2-Tetrachloroethane	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
1,1,1-Trichloroethane	613	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
1,1,2,2-Tetrachloroethane	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
1,1,2-Trichloroethane	-	ND (1.6)	ND (1.6)	ND (1.7)	ND (1.6)	ND (1.7)	ND (1.6)
1,1,2-trichlorotrifluoroethane	-	ND (22)	ND (22)	ND (23)	ND (22)	ND (23)	ND (22)
1,1-Dichloroethane	-	ND (1.6)	ND (1.6)	ND (1.7)	ND (1.6)	ND (1.7)	ND (1.6)
1,1-Dichloroethene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
1,1-Dichloropropene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,2,3-Trichlorobenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,2,3-Trichloropropane	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
1,2,4,5-Tetramethylbenzene	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
1,2,4-Trichlorobenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,2,4-Trimethylbenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,2-Dibromo-3-chloropropane	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,2-Dibromoethane	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
1,2-Dichlorobenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,2-Dichloroethane	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
1,2-Dichloropropane	-	ND (3.8)	ND (3.9)	ND (4.1)	ND (3.8)	ND (4.1)	ND (3.8)
1,3,5-Trimethylbenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,3-Dichlorobenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,3-Dichloropropane	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,4-Dichlorobenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
1,4-Dioxane	-	ND (110)	ND (110)	ND (120)	ND (110)	ND (120)	ND (110)
2,2-Dichloropropane	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
2-Butanone	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
2-Chloroethylvinyl ether	-	ND (22)	ND (22)	ND (23)	ND (22)	ND (23)	ND (22)
2-Hexanone	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
4-Ethyltoluene	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
4-Methyl-2-pentanone	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
Acetone	-	ND (39)	ND (40)	ND (42)	ND (40)	ND (42)	ND (40)
Acrylonitrile	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
Benzene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Bromobenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
Bromochloromethane	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
Bromodichloromethane	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Bromoform	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
Bromomethane	-	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)
Carbon disulfide	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
Carbon tetrachloride	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Chlorobenzene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Chloroethane	-	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)
Chloroform	63	ND (1.6)	ND (1.6)	ND (1.7)	ND (1.6)	ND (1.7)	ND (1.6)
Chloromethane	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
cis-1,2-Dichloroethene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
cis-1,3-Dichloropropene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Cyclohexane	-	ND (22)	ND (22)	ND (23)	ND (22)	ND (23)	ND (22)
Dibromochloromethane	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Dibromomethane	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
Dichlorodifluoromethane	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
Ethyl Acetate	-	ND (22)	ND (22)	ND (23)	ND (22)	ND (23)	ND (22)
Ethyl ether	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
Ethyl methacrylate	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
Ethylbenzene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-4	SM-4	SM-5	SM-5	SM-18	SM-18
Date		11/16/11	11/16/11	11/16/11	11/16/11	11/29/11	11/29/11
Depth (feet below ground surface)		0.5	2	0.5	2	5-5.5	7-7.3
Ethyl-Tert-Butyl-Ether	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
Hexachlorobutadiene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
Isopropyl Ether	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
Isopropylbenzene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Methyl Acetate	-	ND (22)	ND (22)	ND (23)	ND (22)	ND (23)	ND (22)
Methyl cyclohexane	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
Methyl tert butyl ether	-	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)
Methylene chloride	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	13
Naphthalene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
n-Butylbenzene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
n-Propylbenzene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
o-Chlorotoluene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
o-Xylene	-	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)
p/m-Xylene	-	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)
p-Chlorotoluene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
p-Diethylbenzene	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
p-Isopropyltoluene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
sec-Butylbenzene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Styrene	-	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)
Tert-Butyl Alcohol	-	ND (110)	ND (110)	ND (120)	ND (110)	ND (120)	ND (110)
tert-Butylbenzene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
Tertiary-Amyl Methyl Ether	-	ND (4.4)	ND (4.4)	ND (4.6)	ND (4.4)	ND (4.6)	ND (4.4)
Tetrachloroethene	37	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	1.8
Tetrahydrofuran	-	ND (22)	ND (22)	ND (23)	ND (22)	ND (23)	ND (22)
Toluene	-	ND (1.6)	ND (1.6)	ND (1.7)	ND (1.6)	ND (1.7)	ND (1.6)
trans-1,2-Dichloroethene	83	ND (1.6)	ND (1.6)	ND (1.7)	ND (1.6)	ND (1.7)	ND (1.6)
trans-1,3-Dichloropropene	-	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
trans-1,4-Dichloro-2-butene	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
Trichloroethene	13	ND (1.1)	ND (1.1)	ND (1.2)	ND (1.1)	ND (1.2)	ND (1.1)
Trichlorofluoromethane	-	ND (5.5)	ND (5.5)	ND (5.8)	ND (5.5)	ND (5.8)	ND (5.5)
Vinyl acetate	-	ND (11)	ND (11)	ND (12)	ND (11)	ND (12)	ND (11)
Vinyl chloride	-	ND (2.2)	ND (2.2)	ND (2.3)	ND (2.2)	ND (2.3)	ND (2.2)

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-19	SM-19	SM-20	SM-20	SM-21	SM-21
Date		11/29/11	11/29/11	11/29/11	11/29/11	11/29/11	11/29/11
Depth (feet below ground surface)		5.7-6	7-7.3	5.7-6	7-7.3	5-5.3	7.7-8
1,1,1,2-Tetrachloroethane	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
1,1,1-Trichloroethane	613	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
1,1,2,2-Tetrachloroethane	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
1,1,2-Trichloroethane	-	ND (1.6)	ND (92)	ND (1.5)	ND (1.7)	ND (1.6)	ND (94)
1,1,2-trichlorotrifluoroethane	-	ND (21)	ND (1200)	ND (21)	ND (22)	ND (22)	ND (1200)
1,1-Dichloroethane	-	ND (1.6)	ND (92)	ND (1.5)	ND (1.7)	ND (1.6)	ND (94)
1,1-Dichloroethene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
1,1-Dichloropropene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,2,3-Trichlorobenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,2,3-Trichloropropane	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
1,2,4,5-Tetramethylbenzene	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
1,2,4-Trichlorobenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,2,4-Trimethylbenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,2-Dibromo-3-chloropropane	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,2-Dibromoethane	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
1,2-Dichlorobenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,2-Dichloroethane	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
1,2-Dichloropropane	-	ND (3.7)	ND (220)	ND (3.6)	ND (3.9)	ND (3.8)	ND (220)
1,3,5-Trimethylbenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,3-Dichlorobenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,3-Dichloropropane	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,4-Dichlorobenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
1,4-Dioxane	-	ND (110)	ND (6200)	ND (100)	ND (110)	ND (110)	ND (6200)
2,2-Dichloropropane	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
2-Butanone	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
2-Chloroethylvinyl ether	-	ND (21)	ND (1200)	ND (21)	ND (22)	ND (22)	ND (1200)
2-Hexanone	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
4-Ethyltoluene	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
4-Methyl-2-pentanone	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
Acetone	-	ND (38)	ND (2200)	ND (37)	ND (40)	ND (40)	ND (2200)
Acrylonitrile	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
Benzene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Bromobenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
Bromochloromethane	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
Bromodichloromethane	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Bromoform	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
Bromomethane	-	ND (2.1)	ND (120)	ND (2.1)	ND (2.2)	ND (2.2)	ND (120)
Carbon disulfide	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
Carbon tetrachloride	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Chlorobenzene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Chloroethane	-	ND (2.1)	ND (120)	ND (2.1)	ND (2.2)	ND (2.2)	ND (120)
Chloroform	63	ND (1.6)	ND (92)	ND (1.5)	ND (1.7)	ND (1.6)	ND (94)
Chloromethane	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
cis-1,2-Dichloroethene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
cis-1,3-Dichloropropene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Cyclohexane	-	ND (21)	ND (1200)	ND (21)	ND (22)	ND (22)	ND (1200)
Dibromochloromethane	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Dibromomethane	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
Dichlorodifluoromethane	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
Ethyl Acetate	-	ND (21)	1600	ND (21)	ND (22)	ND (22)	1600
Ethyl ether	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
Ethyl methacrylate	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
Ethylbenzene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-19	SM-19	SM-20	SM-20	SM-21	SM-21
Date		11/29/11	11/29/11	11/29/11	11/29/11	11/29/11	11/29/11
Depth (feet below ground surface)		5.7-6	7-7.3	5.7-6	7-7.3	5-5.3	7.7-8
Ethyl-Tert-Butyl-Ether	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
Hexachlorobutadiene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
Isopropyl Ether	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
Isopropylbenzene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Methyl Acetate	-	ND (21)	ND (1200)	ND (21)	ND (22)	ND (22)	ND (1200)
Methyl cyclohexane	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
Methyl tert butyl ether	-	ND (2.1)	ND (120)	ND (2.1)	ND (2.2)	ND (2.2)	ND (120)
Methylene chloride	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
Naphthalene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
n-Butylbenzene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
n-Propylbenzene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
o-Chlorotoluene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
o-Xylene	-	ND (2.1)	ND (120)	ND (2.1)	ND (2.2)	ND (2.2)	ND (120)
p/m-Xylene	-	ND (2.1)	ND (120)	ND (2.1)	ND (2.2)	ND (2.2)	ND (120)
p-Chlorotoluene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
p-Diethylbenzene	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
p-Isopropyltoluene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
sec-Butylbenzene	-	3.0	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Styrene	-	ND (2.1)	ND (120)	ND (2.1)	ND (2.2)	ND (2.2)	ND (120)
Tert-Butyl Alcohol	-	ND (110)	ND (6200)	ND (100)	ND (110)	ND (110)	ND (6200)
tert-Butylbenzene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
Tertiary-Amyl Methyl Ether	-	ND (4.2)	ND (250)	ND (4.1)	ND (4.4)	ND (4.4)	ND (250)
Tetrachloroethene	37	1.8	ND (62)	4.9	1.2	4.6	ND (62)
Tetrahydrofuran	-	ND (21)	ND (1200)	ND (21)	ND (22)	ND (22)	ND (1200)
Toluene	-	ND (1.6)	ND (92)	ND (1.5)	ND (1.7)	ND (1.6)	ND (94)
trans-1,2-Dichloroethene	83	ND (1.6)	ND (92)	ND (1.5)	ND (1.7)	ND (1.6)	ND (94)
trans-1,3-Dichloropropene	-	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
trans-1,4-Dichloro-2-butene	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
Trichloroethene	13	ND (1.1)	ND (62)	ND (1.0)	ND (1.1)	ND (1.1)	ND (62)
Trichlorofluoromethane	-	ND (5.3)	ND (310)	ND (5.2)	ND (5.6)	ND (5.5)	ND (310)
Vinyl acetate	-	ND (11)	ND (620)	ND (10)	ND (11)	ND (11)	ND (620)
Vinyl chloride	-	ND (2.1)	ND (120)	ND (2.1)	ND (2.2)	ND (2.2)	ND (120)

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-22	SM-22	SM-23	SM-23
Date		11/29/11	11/29/11	11/29/11	11/29/11
Depth (feet below ground surface)		5.7-6	7-7.3	5-5.3	7-7.3
1,1,1,2-Tetrachloroethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
1,1,1-Trichloroethane	613	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
1,1,2,2-Tetrachloroethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
1,1,2-Trichloroethane	-	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.8)
1,1,2-trichlorotrifluoroethane	-	ND (23)	ND (22)	ND (22)	ND (23)
1,1-Dichloroethane	-	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.8)
1,1-Dichloroethene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
1,1-Dichloropropene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,2,3-Trichlorobenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,2,3-Trichloropropane	-	ND (11)	ND (11)	ND (11)	ND (12)
1,2,4,5-Tetramethylbenzene	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
1,2,4-Trichlorobenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,2,4-Trimethylbenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,2-Dibromo-3-chloropropane	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,2-Dibromoethane	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
1,2-Dichlorobenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,2-Dichloroethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
1,2-Dichloropropane	-	ND (4.0)	ND (3.9)	ND (3.9)	ND (4.1)
1,3,5-Trimethylbenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,3-Dichlorobenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,3-Dichloropropane	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,4-Dichlorobenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
1,4-Dioxane	-	ND (110)	ND (110)	ND (110)	ND (120)
2,2-Dichloropropane	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
2-Butanone	-	ND (11)	ND (11)	ND (11)	ND (12)
2-Chloroethylvinyl ether	-	ND (23)	ND (22)	ND (22)	ND (23)
2-Hexanone	-	ND (11)	ND (11)	ND (11)	ND (12)
4-Ethyltoluene	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
4-Methyl-2-pentanone	-	ND (11)	ND (11)	ND (11)	ND (12)
Acetone	-	ND (41)	ND (40)	ND (40)	ND (42)
Acrylonitrile	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
Benzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Bromobenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
Bromochloromethane	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
Bromodichloromethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Bromoform	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
Bromomethane	-	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.3)
Carbon disulfide	-	ND (11)	ND (11)	ND (11)	ND (12)
Carbon tetrachloride	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Chlorobenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Chloroethane	-	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.3)
Chloroform	63	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.8)
Chloromethane	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
cis-1,2-Dichloroethene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
cis-1,3-Dichloropropene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Cyclohexane	-	ND (23)	ND (22)	ND (22)	ND (23)
Dibromochloromethane	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Dibromomethane	-	ND (11)	ND (11)	ND (11)	ND (12)
Dichlorodifluoromethane	-	ND (11)	ND (11)	ND (11)	ND (12)
Ethyl Acetate	-	ND (23)	ND (22)	ND (22)	ND (23)
Ethyl ether	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
Ethyl methacrylate	-	ND (11)	ND (11)	ND (11)	ND (12)
Ethylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)

Table 3-2. Summary of 2011 VOC Soil Sample Results.

Location	Target Soil Conc.	SM-22	SM-22	SM-23	SM-23
Date		**11/29/11**	**11/29/11**	**11/29/11**	**11/29/11**
Depth (feet below ground surface)		**5.7-6**	**7-7.3**	**5-5.3**	**7-7.3**
Ethyl-Tert-Butyl-Ether	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
Hexachlorobutadiene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
Isopropyl Ether	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
Isopropylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Methyl Acetate	-	ND (23)	ND (22)	ND (22)	ND (23)
Methyl cyclohexane	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
Methyl tert butyl ether	-	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.3)
Methylene chloride	-	ND (11)	ND (11)	ND (11)	ND (12)
Naphthalene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
n-Butylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
n-Propylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
o-Chlorotoluene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
o-Xylene	-	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.3)
p/m-Xylene	-	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.3)
p-Chlorotoluene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
p-Diethylbenzene	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
p-Isopropyltoluene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
sec-Butylbenzene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Styrene	-	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.3)
Tert-Butyl Alcohol	-	ND (110)	ND (110)	ND (110)	ND (120)
tert-Butylbenzene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
Tertiary-Amyl Methyl Ether	-	ND (4.6)	ND (4.4)	ND (4.5)	ND (4.7)
Tetrachloroethene	37	1.4	1.7	2.0	1.3
Tetrahydrofuran	-	ND (23)	ND (22)	ND (22)	ND (23)
Toluene	-	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.8)
trans-1,2-Dichloroethene	83	ND (1.7)	ND (1.7)	ND (1.7)	ND (1.8)
trans-1,3-Dichloropropene	-	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
trans-1,4-Dichloro-2-butene	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
Trichloroethene	13	ND (1.1)	ND (1.1)	ND (1.1)	ND (1.2)
Trichlorofluoromethane	-	ND (5.7)	ND (5.6)	ND (5.6)	ND (5.9)
Vinyl acetate	-	ND (11)	ND (11)	ND (11)	ND (12)
Vinyl chloride	-	ND (2.3)	ND (2.2)	ND (2.2)	ND (2.3)

Concentrations in µg/kg
ND (1.1) - Not detected at detection limit indicated in parentheses.

Table 3-3. Summary of 2011 PAH Soil Sample Results.

Location	SM-24	SM-24	SM-25	SM-26	SM-26	SM-27	SM-28	SM-28	SM-29
Date	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11
Depth (feet below ground surface)	0.5-1.5	2-3	0.5-1.5	0.5-1.5	2-3	0.5-1.5	0.5-1.5	2-3	0.5-1.5
1-Methylnaphthalene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
2-Chloronaphthalene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
2-Methylnaphthalene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
Acenaphthene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
Acenaphthylene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
Anthracene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
Benzo(a)anthracene*	ND (1700)	ND (69)	ND (31)	ND (8000)	19	ND (14)	400	ND (14)	ND (14)
Benzo(a)pyrene*	ND (1700)	120	ND (31)	ND (8000)	33	16	700	25	17
Benzo(b)fluoranthene*	1900	160	42	ND (8000)	47	22	1100	41	26
Benzo(ghi)perylene	ND (1700)	110	ND (31)	ND (8000)	32	ND (14)	620	26	16
Benzo(k)fluoranthene*	ND (1700)	91	ND (31)	ND (8000)	29	14	520	24	16
Chrysene*	ND (1700)	120	ND (31)	ND (8000)	32	16	640	25	17
Dibenzo(a,h)anthracene*	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
Fluoranthene	2700	190	49	ND (8000)	63	38	1300	48	30
Fluorene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
Hexachlorobenzene	ND (6800)	ND (280)	ND (120)	ND (32000)	ND (60)	ND (54)	ND (580)	ND (56)	ND (55)
Hexachlorobutadiene	ND (4300)	ND (170)	ND (78)	ND (20000)	ND (37)	ND (34)	ND (360)	ND (35)	ND (34)
Hexachloroethane	ND (6800)	ND (280)	ND (120)	ND (32000)	ND (60)	ND (54)	ND (580)	ND (56)	ND (55)
Indeno(1,2,3-c,d)pyrene*	ND (1700)	92	ND (31)	ND (8000)	30	ND (14)	570	24	15
Naphthalene	ND (1700)	ND (69)	ND (31)	ND (8000)	ND (15)	ND (14)	ND (140)	ND (14)	ND (14)
Pentachlorophenol	ND (6800)	ND (280)	ND (120)	ND (32000)	ND (60)	ND (54)	ND (580)	ND (56)	ND (55)
Phenanthrene	ND (1700)	ND (69)	ND (31)	ND (8000)	24	16	420	15	ND (14)
Pyrene	2100	140	40	ND (8000)	48	29	1000	36	24
Total cPAHs	1900	583	42	ND (56000)	190	68	3930	139	91

Table 3-3. Summary of 2011 PAH Soil Sample Results.

Location	SM-30	SM-30	SM-31	SM-32	SM-32	SM-33	SM-33	SM-34	SM-34
Date	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11	11/15/11
Depth (feet below ground surface)	0.5-1.5	2-3	0.5-1.5	0.5-1.5	2-3	0.5-1.5	2-3	0.5-1.5	2-3
1-Methylnaphthalene	ND (76)	ND (15)	ND (15)	ND (27)	ND (14)	ND (65)	ND (16)	ND (34)	ND (15)
2-Chloronaphthalene	ND (76)	ND (15)	ND (15)	ND (27)	17	ND (65)	ND (16)	ND (34)	ND (15)
2-Methylnaphthalene	ND (76)	ND (15)	ND (15)	ND (27)	14	ND (65)	ND (16)	ND (34)	ND (15)
Acenaphthene	ND (76)	ND (15)	ND (15)	ND (27)	ND (14)	ND (65)	ND (16)	ND (34)	ND (15)
Acenaphthylene	ND (76)	ND (15)	ND (15)	ND (27)	ND (14)	ND (65)	ND (16)	ND (34)	ND (15)
Anthracene	ND (76)	ND (15)	ND (15)	ND (27)	35	ND (65)	ND (16)	ND (34)	ND (15)
Benzo(a)anthracene*	370	ND (15)	ND (15)	220	110	140	74	52	ND (15)
Benzo(a)pyrene*	630	ND (15)	ND (15)	360	150	180	95	88	ND (15)
Benzo(b)fluoranthene*	920	ND (15)	ND (15)	460	170	240	120	150	ND (15)
Benzo(ghi)perylene	520	ND (15)	ND (15)	260	100	130	61	70	ND (15)
Benzo(k)fluoranthene*	440	ND (15)	ND (15)	230	100	130	59	57	ND (15)
Chrysene*	520	ND (15)	ND (15)	220	94	120	58	80	ND (15)
Dibenzo(a,h)anthracene*	110	ND (15)	ND (15)	58	40	ND (65)	ND (16)	ND (34)	ND (15)
Fluoranthene	1100	ND (15)	ND (15)	510	200	270	130	140	ND (15)
Fluorene	ND (76)	ND (15)	ND (15)	ND (27)	21	ND (65)	ND (16)	ND (34)	ND (15)
Hexachlorobenzene	ND (300)	ND (60)	ND (59)	ND (110)	ND (58)	ND (260)	ND (63)	ND (130)	ND (60)
Hexachlorobutadiene	ND (190)	ND (37)	ND (37)	ND (68)	ND (36)	ND (160)	ND (39)	ND (84)	ND (38)
Hexachloroethane	ND (300)	ND (60)	ND (59)	ND (110)	ND (58)	ND (260)	ND (63)	ND (130)	ND (60)
Indeno(1,2,3-c,d)pyrene*	500	ND (15)	ND (15)	240	100	130	59	69	ND (15)
Naphthalene	ND (76)	ND (15)	ND (15)	ND (27)	ND (14)	ND (65)	ND (16)	ND (34)	ND (15)
Pentachlorophenol	ND (300)	ND (60)	ND (59)	ND (110)	ND (58)	ND (260)	ND (63)	ND (130)	ND (60)
Phenanthrene	340	ND (15)	ND (15)	87	52	ND (65)	16	50	ND (15)
Pyrene	910	ND (15)	ND (15)	430	170	220	110	110	ND (15)
Total cPAHs	3490	ND (105)	ND (105)	1788	764	940	465	496	ND (105)

Table 3-3. Summary of 2011 PAH Soil Sample Results.

Location	SM-35	SM-35	SM-36	SM-36	SM-37	SM-37
Date	11/15/11	11/15/11	11/15/11	11/15/11	12/19/11	12/19/11
Depth (feet below ground surface)	0.5-1.5	2-3	0.5-1.5	2-3	0.5-1.5	2-3
1-Methylnaphthalene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
2-Chloronaphthalene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
2-Methylnaphthalene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
Acenaphthene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
Acenaphthylene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
Anthracene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
Benzo(a)anthracene*	370	ND (15)	ND (63)	ND (15)	35	ND (14)
Benzo(a)pyrene*	520	ND (15)	87	ND (15)	61	ND (14)
Benzo(b)fluoranthene*	780	15	130	ND (15)	73	ND (14)
Benzo(ghi)perylene	430	ND (15)	73	ND (15)	44	ND (14)
Benzo(k)fluoranthene*	440	ND (15)	67	ND (15)	45	ND (14)
Chrysene*	460	ND (15)	84	ND (15)	40	ND (14)
Dibenzo(a,h)anthracene*	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
Fluoranthene	870	17	160	ND (15)	73	ND (14)
Fluorene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
Hexachlorobenzene	ND (760)	ND (60)	ND (250)	ND (61)	ND (55)	ND (58)
Hexachlorobutadiene	ND (480)	ND (38)	ND (160)	ND (38)	ND (34)	ND (36)
Hexachloroethane	ND (760)	ND (60)	ND (250)	ND (61)	ND (55)	ND (58)
Indeno(1,2,3-c,d)pyrene*	420	ND (15)	71	ND (15)	46	ND (14)
Naphthalene	ND (190)	ND (15)	ND (63)	ND (15)	ND (14)	ND (14)
Pentachlorophenol	ND (760)	ND (60)	ND (250)	ND (61)	ND (55)	ND (58)
Phenanthrene	270	ND (15)	ND (63)	ND (15)	15	ND (14)
Pyrene	670	15	120	ND (15)	66	ND (14)
Total cPAHs	2990	15	439	ND (105)	300	ND (98)

Concentrations in µg/kg
ND (60) - Not detected at detection limit indicated in parentheses.
* - Carcinogenic polyaromatic hydrocarbons (cPAH)
Shaded - cPAH concentration exceeds target soil concentration of 690 µg/kg.

TABLE 4-1. SUMMARY OF PROPOSED CONFIRMATORY SOIL SAMPLING LOCATIONS

<table>
<tr><th>Locations</th><th>Sample Depths</th><th>Number of Samples</th><th>Analysis</th></tr>
<tr><td colspan="4">Passivating Area Drain Line</td></tr>
<tr><td>3 locations</td><td>1-2 feet bgs</td><td>3</td><td>PCBs by EPA Method 8082 with Microwave Extraction Method 3546</td></tr>
<tr><td colspan="4">Between Former Warehouse and 1974 Building Addition</td></tr>
<tr><td>Eastern Wall</td><td>7-8 feet bgs (below “newer” fill) and Base of excavation (~10 feet bgs)</td><td rowspan="5">10</td><td rowspan="5">PCBs by EPA Method 8082 with Microwave Extraction Method 3546;
VOCs by EPA Method 8260B with low-level detection limits</td></tr>
<tr><td>Western Wall</td><td>5-7 feet bgs (below “newer” fill) and Base of excavation (~10 feet bgs)</td></tr>
<tr><td>Northern Wall</td><td>5-7 feet bgs and Base of excavation (~10 feet bgs)</td></tr>
<tr><td>Southern Wall</td><td>7-8 feet bgs and Base of excavation (~10 feet bgs)</td></tr>
<tr><td>1 location at SM-19
1 location at SM-21</td><td>Bottom of excavation (~10 feet bgs)</td></tr>
<tr><td colspan="4">South Drainage Ditch</td></tr>
<tr><td>3 locations at west end
2 side wall locations at SM-28
2 side wall locations at SM-35</td><td>0.5-1.5 feet bgs</td><td rowspan="3">11</td><td rowspan="3">cPAHs by EPA Method 8270CSIM</td></tr>
<tr><td>1 location south of SM-32
1 location west of SM-32
1 location east of SM-32</td><td>0.5-1.5 feet bgs and base of excavation (~4 feet bgs)</td></tr>
<tr><td>1 location at SM-32</td><td>Bottom of excavation (~4 feet bgs)</td></tr>
</table>

FIGURES

SS-18 TEST PIT/SOIL SAMPLING LOCATIONS (SS-# = SOIL SAMPLE ID.)

EPA SOIL SAMPLE LOCATION (2006)

GP-7 GEOPHYSICAL SURVEY ANOMALY TEST PIT

BB12 FIELD SOIL HEAD-SPACE SCREENING LOCATION (PID)

AREA 4 GROUND SCAR TEST PITS

NOTE:

1. BASE MAP AND WELL LOCATIONS WHEN POSSIBLE PROVIDED BY CARTER & BURGESS PLAN TITLED "EXISTING CONDITIONS PLAN WASHINGTON STREET WOBURN, MASSACHUSETTS" DATED JULY 28, 2005 PREPARED BY CHAS. H. SELLS, INC.

2. EXPLORATION TRENCHES/PITS DIGITIZED FROM MAP TITLED "CRYOVAC SITE EXPLORATION MAP" PREPARED BY GEOTRANS, INC DATED 1985.

3. BUILDING UNDERGROUND PIPING DIGITIZED FROM VARIOUS BUILDING PLANS PROVIDED BY W.R. GRACE.

4. ECS SOIL BORINGS LOCATIONS INSIDE THE BUILDING AND ECS-1 FROM MAP TITLED "SITE PLAN" PREPARED BY ECS DATED MAR. 2005 AND FROM FIELD MEASUREMENTS TAKEN BEFORE SLAB REMOVAL. ALL OTHER ECS BORINGS FROM CARTER & BURGESS BASE MAP (SEE NOTE 1).

5. US EPA SOIL BORINGS DIGITIZED FROM MAP TITLED "FIGURE 4-5 W.R GRACE PROPERTY SOIL BORING AND SURFACE WATER SEDIMENT LOCATIONS" PREPARED BY THE US EPA.

6. SILT FENCE & HAY BALE BARRIER DIGITIZED FROM SKETCH PREPARED BY CHARTER ENVIRONMENTAL, JUNE 2006

BUILDING REMOVAL SAMPLING LOCATION NOTE:

1. PRE-DETERMINED TEST PIT/SOIL SAMPLING LOCATION FROM TAPE SURVEY AT THE TIME OF SAMPLING

2. FIELD SOIL SCREENING LOCATIONS BASED ON THE FIELD SAMPLING LOCATION SKETCH MAP AND FROM THE APPROXIMATE LOCATION DESCRIPTIONS IN THE SOIL COLLECTION FIELD FORM

UNDER FLOOR PIPING EXPLANATION

SANITARY SEWER

ROOF DRAIN

DASH INDICATES PIPE FOUND DURING SLAB REMOVAL AND WAS NOT ON ORGINAL PLANS

0 40'
Scale in feet

JG Environmental Inc.
WATER RESOURCES CONSULTING

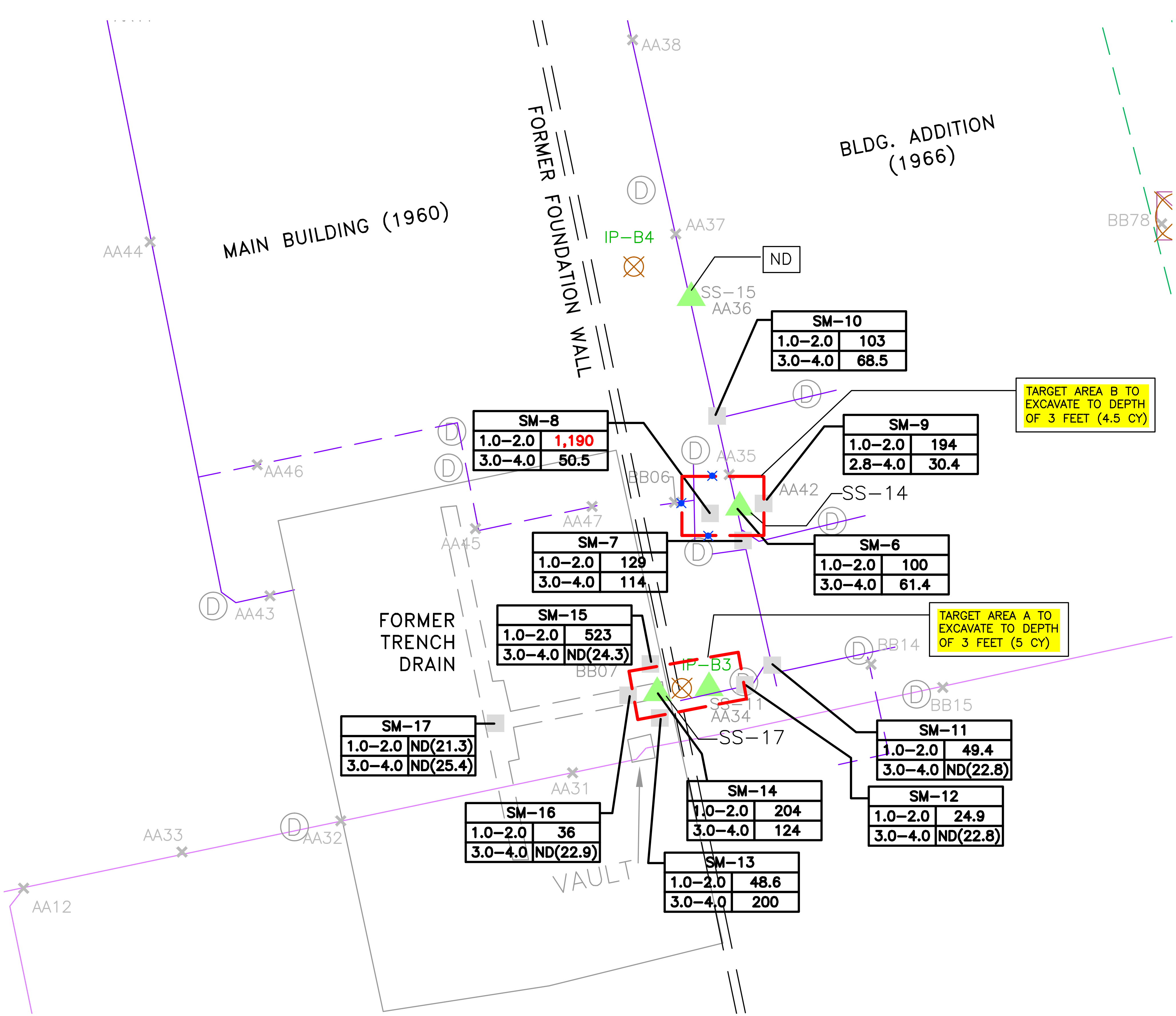
TETRA TECH GEO

TITLE: LOCATION OF HISTORIC SOIL SAMPLES EXCEEDING ROD ACTON LEVELS

LOCATION: W.R. Grace, Woburn, Massachusetts

APPROVED	ASB JRB
DRAFTED	RMK
PROJECT#	117-3008
DATE	JAN 2012

FIGURE 3-1



EXPLANATION

RW22–B1 — SOIL BORING LOCATION RW–22 AREA EVALUATION

IP–B9 — SOIL BORING LOCATION IP EVALUATION (DEMOLITION RELATED)

BB12 — FIELD SOIL HEAD–SPACE SCREENING LOCATION (PID)

SS–17 AA34 — TEST PIT/SOIL SAMPLING LOCATIONS (SS–# = SOIL SAMPLE ID.)

AREA 4 GROUND SCAR TEST PITS

TENTATIVE GROUND SCAR LOCATION AS INDICATED IN EPA 1988 SITE ANALYSIS

SOIL SAMPLING RESULTS (FALL 2011)

LOCATION	
FEET	ug/kg

ug/kg — PCB (Arochlor 1254)

FEET — SAMPLE DEPTH

1,040 RESULT EXCEEDS ROD ACTION LEVEL OF 1,040 ug/kg

ND(22.8) NOT DETECTED (AT DETECTION LIMIT)

TARGET LOCATION OF POST EXCAVATION CONFIRMATORY PCB SAMPLE

UNDER FLOOR PIPING EXPLANATION

(D) FLOOR DRAIN

SANITARY SEWER

ROOF DRAIN

DASH INDICATES PIPE FOUND DURING SLAB REMOVAL AND WAS NOT ON ORGINAL PLANS

0 10'
Scale in feet

G:\GRACE\CENTRAL\2011\12-11_SB-RESULTS\SB-LOCA-DATA.DWG

JG Environmental Inc. WATER RESOURCES CONSULTING

TETRA TECH GEO

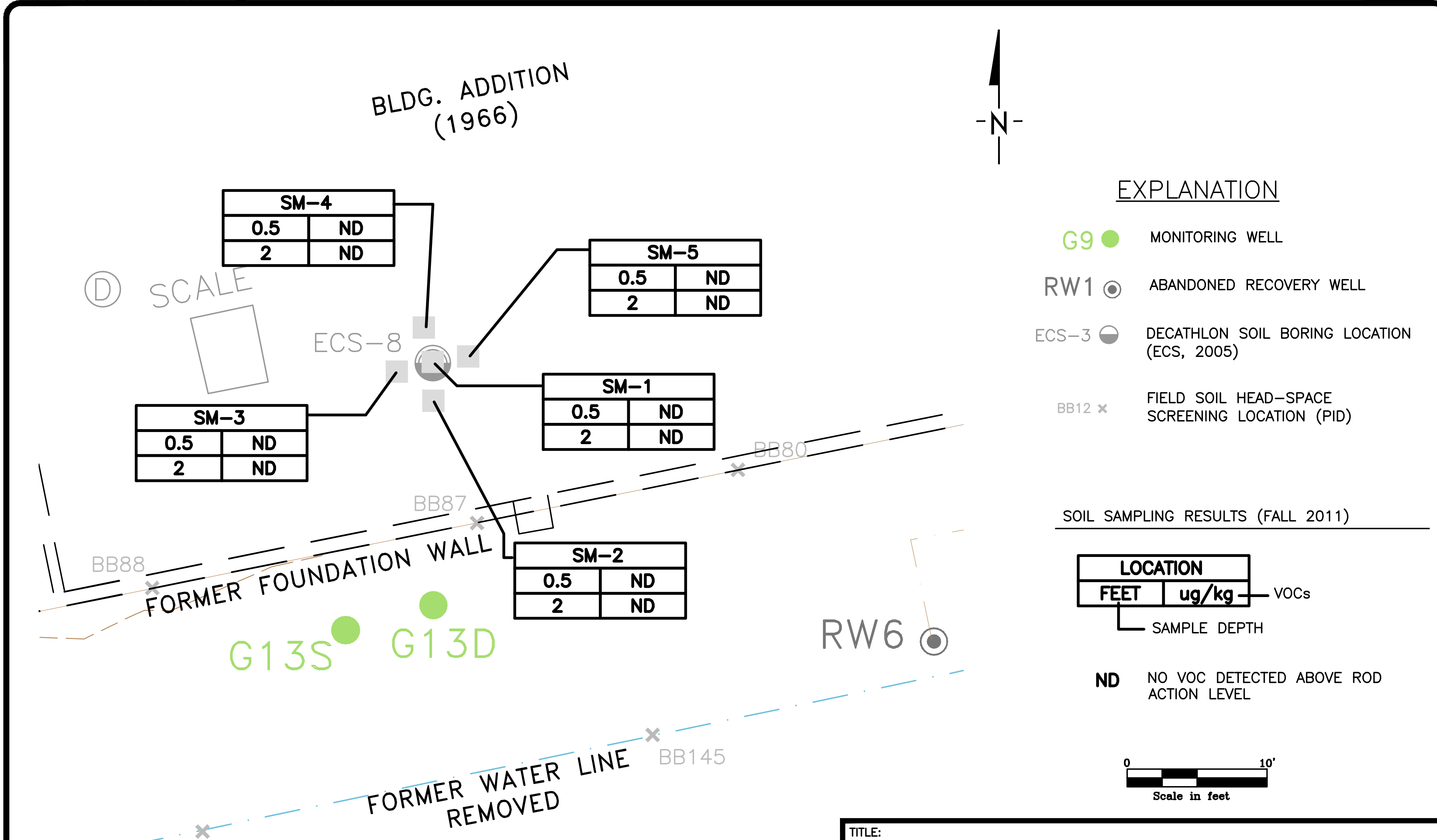
TITLE: SS-14 & 17 AREA SOIL INVESTIGATION - PCB RESULTS

LOCATION: W.R. Grace, Woburn, Massachusetts

APPROVED	ABS JRB
DRAFTED	RMK
PROJECT#	117–3008
DATE	JAN 2012

FIGURE 3-2

G:\GRACE\CENTRAL\2011\12-11_SB-RESULTS\SB-LOCA-DATA.DWG



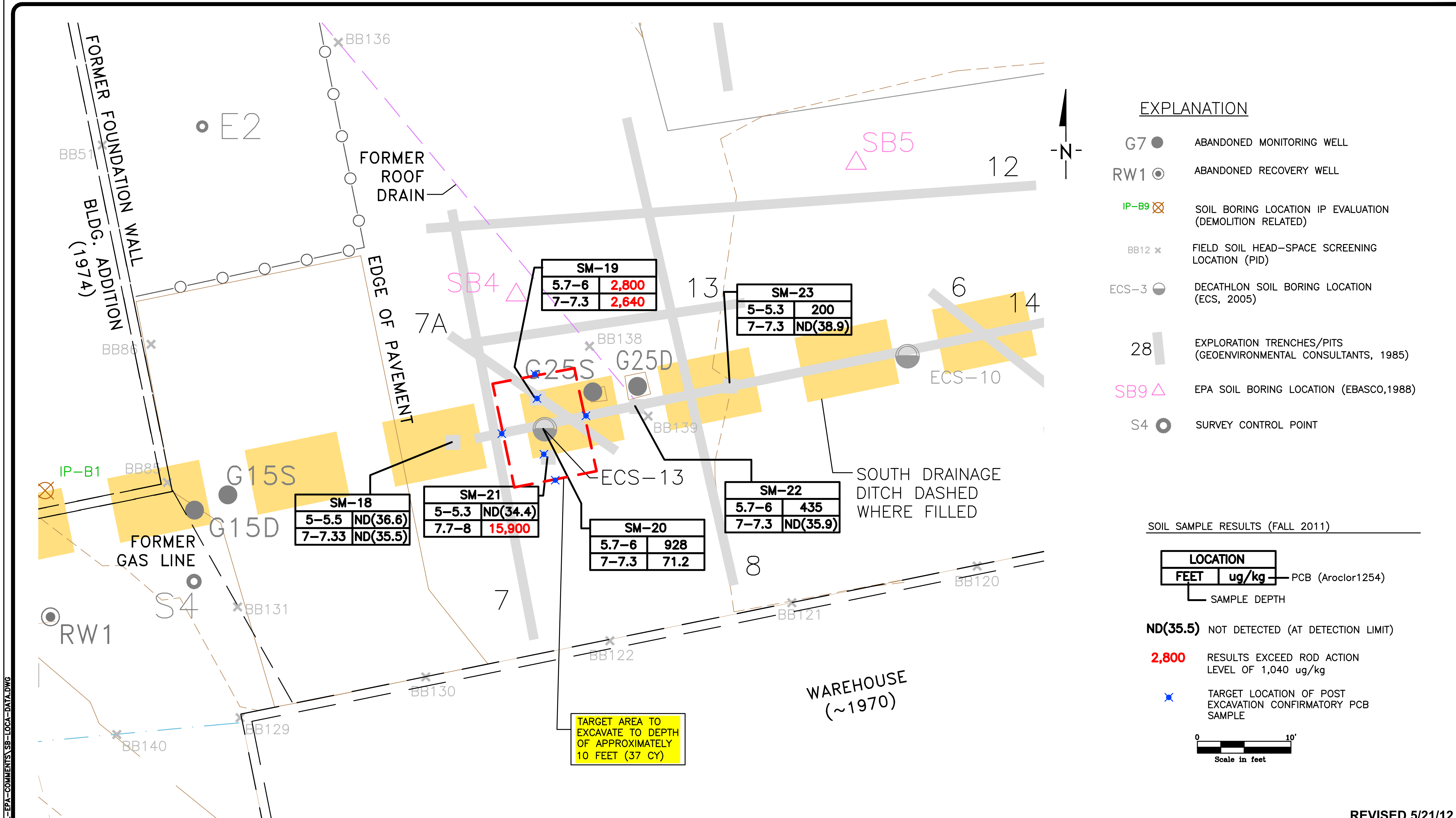
TITLE:
ECS-8 AREA SOIL INVESTIGATION - VOC RESULTS

LOCATION: **W.R. Grace, Woburn, Massachusetts**

JG Environmental Inc.
WATER RESOURCES CONSULTING

TETRA TECH GEO

APPROVED	ABS JRB	FIGURE
DRAFTED	RMK	3-3
PROJECT#	117-3008	
DATE	JAN 2012	



REVISED 5/21/12

TITLE: ECS-13 AREA SOIL INVESTIGATION - PCB RESULTS

LOCATION: W.R. Grace, Woburn, Massachusetts

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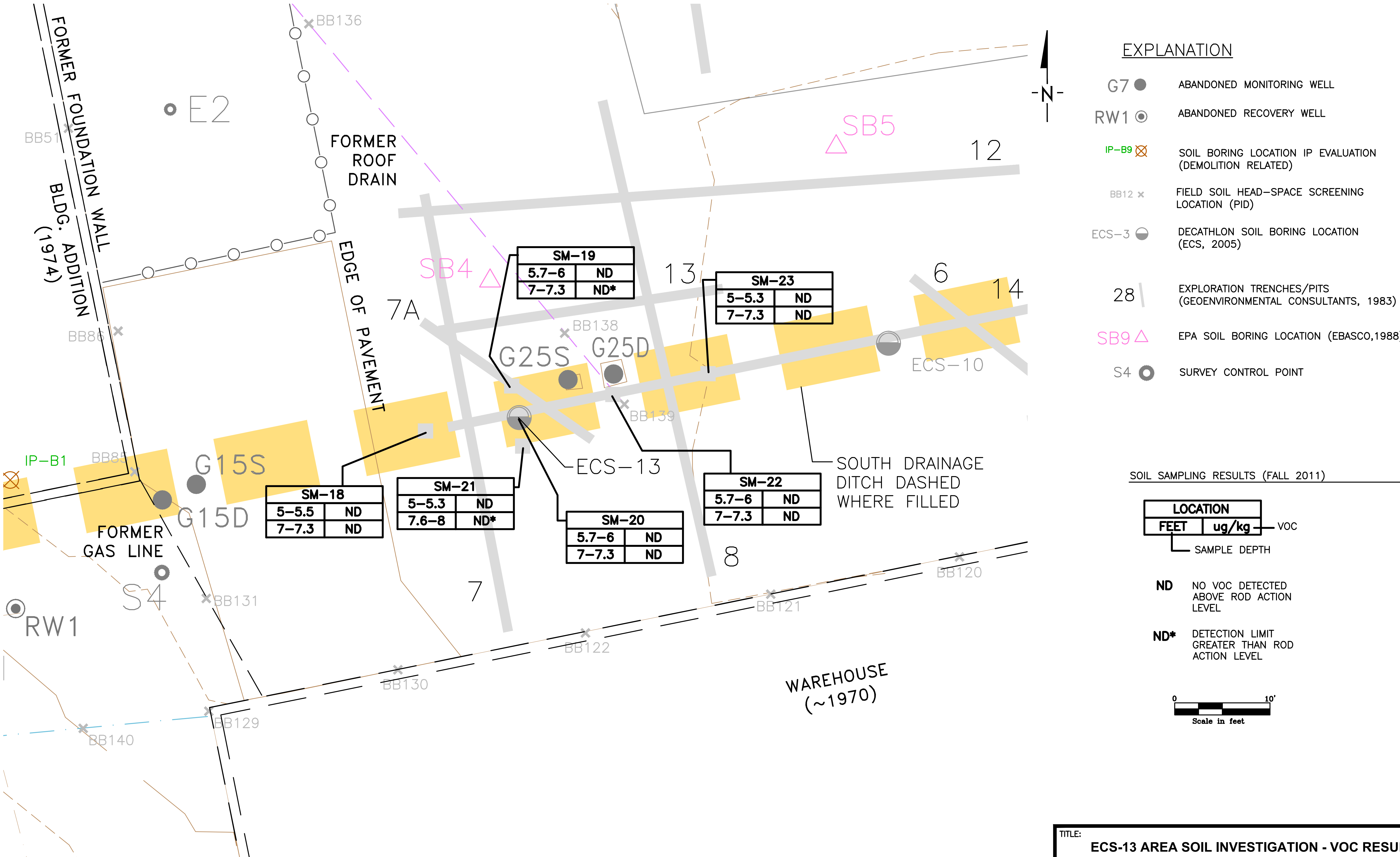
TETRA TECH GEO

APPROVED	ABS JRB
DRAFTED	RMK
PROJECT#	117-3008
DATE	JAN 2012

FIGURE 3-4

G:\GRACE\CENTRAL\2012\05-12_SOIL-EPA-COMMENTS\SB-LOCA-DATA.DWG



G:\GRACE\CENTRAL\2011\12-11_SB-RESULTS\SB-LOCA-DATA.DWG

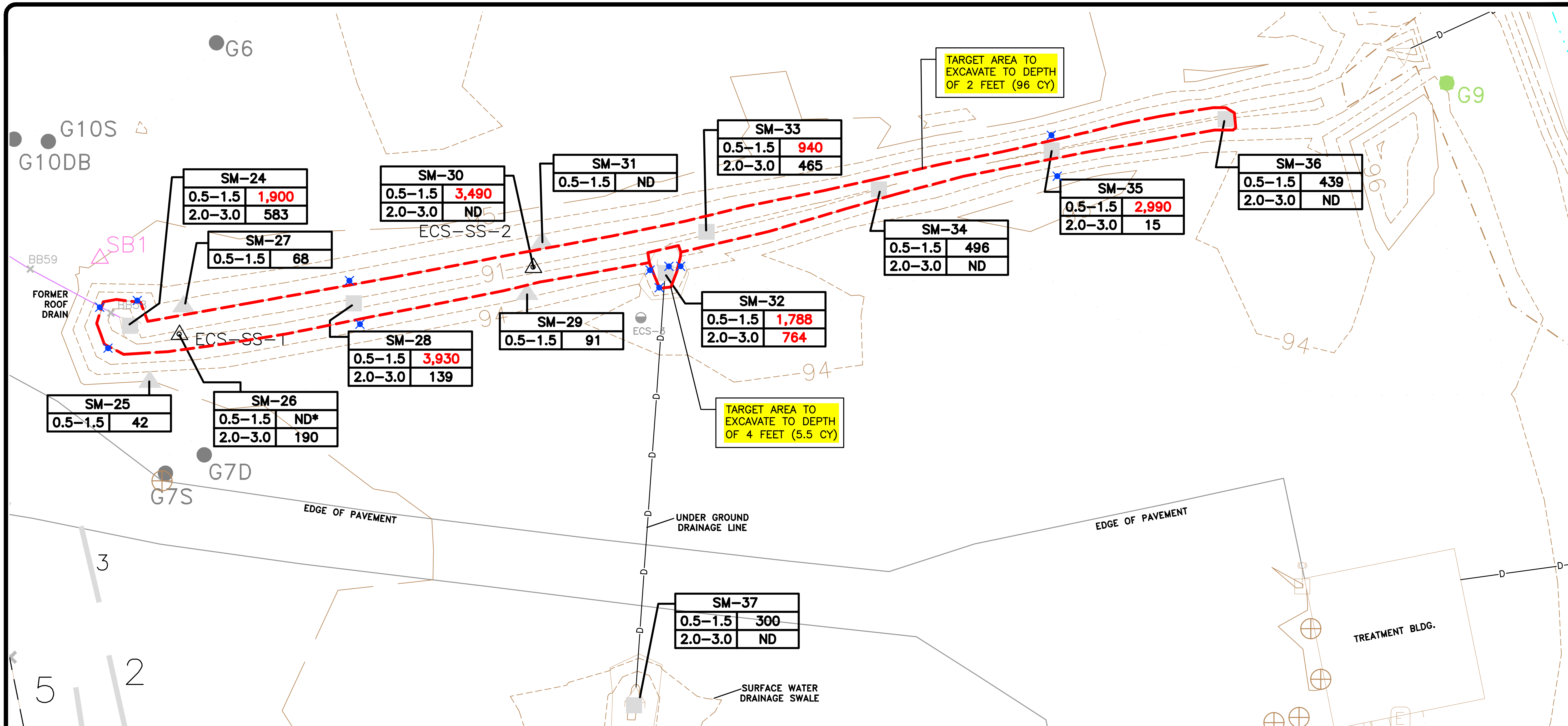
TITLE:
ECS-13 AREA SOIL INVESTIGATION - VOC RESULTS

LOCATION:
W.R. Grace, Woburn, Massachusetts

JG Environmental Inc.
WATER RESOURCES CONSULTING

TETRA TECH GEO

APPROVED	ABS JRB	FIGURE
DRAFTED	RMK	3-5
PROJECT#	117−3008	
DATE	DEC 2011	



EXPLANATION

- G9 — MONITORING WELL
- G7 — ABANDONED MONITORING WELL
- SS-2 — DECATHLON SOIL SAMPLE LOCATION (ECS, 2005)
- 28 — EXPLORATION TRENCHES/PITS (GEOENVIRONMENTAL CONSULTANTS, 1985)
- BB12 × — FIELD SOIL HEAD-SPACE SCREENING LOCATION (PID)
- SB9 — EPA SOIL BORING LOCATION (EBASCO,1988)
- TWO DEPTH SOIL SAMPLE LOCATION
- SURFICIAL SOIL SAMPLE LOCATION
- TARGET LOCATION OF POST EXCAVATION CONFIRMATORY cPAH SAMPLE

SOIL SAMPLING RESULTS (FALL 2011)

LOCATION	
FEET	ug/kg

FEET: SAMPLE DEPTH
ug/kg: TOTAL ROD SPECIFIC cPAHs

- * DETECTION LIMIT GREATER THAN ROD ACTION LEVEL 690 ug/kg
- ND NOT DETECTED
- 690 RESULT EXCEEDS ROD ACTION LEVEL 690 ug/kg

0 — 20' Scale in feet

REVISED 5/21/12

TITLE: ECS-SS-1 & ECS-SS-2 AREA SOIL INVESTIGATION cPAH RESULTS

LOCATION: W.R. Grace, Woburn, Massachusetts

JG Environmental Inc. WATER RESOURCES CONSULTING

TETRA TECH GEO

APPROVED	ABS JRB
DRAFTED	RMK
PROJECT#	117-3008
DATE	JAN 2012

FIGURE 3-6

G:\GRACE\CENTRAL\2012\05-12_SOIL-EPA-COMMENTS\SB-LOCA-DATA.DWG

APPENDIX A

TEST PIT AND BORING LOGS

SM-1 THROUGH SM-37

LOG OF TEST PIT SM-01

Date Excavated: 11/16/11 | Logged by: COC

Equipment: Backhoe | Surface Elevation(ft): 95.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
0.5		Sample SM-1-0.5 collected at 0.5' BGS		0.0			VOC 8260 LOW
1.0							
1.5							
2.0		Sample SM-1-2 collected at 2' BGS.		0.0			VOC 8260 LOW
		Bottom of hole at 2					

LOG OF TEST PIT SM-02

Date Excavated: 11/16/11 | Logged by: COC

Equipment: Backhoe | Surface Elevation(ft): 95.7

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
0.5		Sample SM-2-0.5 collected at 0.5' BGS.		0.0			VOC 8260 LOW
		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0							
1.5							
2.0		Sample SM-2-2 collected at 2' BGS.		0.0			VOC 8260 LOW
		Bottom of hole at 2					

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LOG OF TEST PIT SM-03

Date Excavated: 11/16/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 95.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
0.5		Sample SM-3-0.5 collected at 0.5' BGS.		0.0			VOC 8260 LOW
1.0							
1.5							
2.0		Sample SM-3-2 collected at 2' BGS.		0.0			VOC 8260 LOW
		Bottom of hole at 2					

LOG OF TEST PIT SM-04

Date Excavated: 11/16/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 95.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
0.5		Sample SM-4-0.5 collected at small layer of darker orange soil 0.5' BGS.		0.0			VOC 8260 LOW
1.0							
1.5							
2.0		Sample SM-4-2 collected at 2' BGS.		0.0			VOC 8260 LOW
		Bottom of hole at 2					

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LOG OF TEST PIT SM-05

Date Excavated: 11/16/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 95.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
0.5		Sample SM-5-0.5 collected at 0.5' BGS.		0.0			VOC 8260 LOW
1.0							
1.5							
2.0		Sample SM-5-2 collected at 2' BGS.		0.0			VOC 8260 LOW
		Bottom of hole at 2					

LOG OF TEST PIT SM-06

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 97.3

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0		Composite Sample SM-6-2 collected from 1-2' BGS.					PCBs 8082
1.5							
2.0							
2.5							
3.0							PCBs 8082
3.5		Composite Sample SM-6-4 collected from 3-4' BGS.					
4.0							
		Bottom of hole at 4					

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LOG OF TEST PIT SM-07

Date Excavated: 11/14/11 | Logged by: COC

Equipment: Backhoe | Surface Elevation(ft): 97.2

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, trace boulders, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0							
1.5		Composite Sample SM-7-2 collected from 1-2' BGS.					PCBs 8082
2.0							
2.5							
3.0							
3.5		Composite Sample SM-7-4 collected from 3-4' BGS.					PCBs 8082
4.0		Bottom of hole at 4					

LOG OF TEST PIT SM-08

Date Excavated: 11/14/11 | Logged by: COC

Equipment: Backhoe | Surface Elevation(ft): 97.2

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND some gravel, some cobbles, trace boulders, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0							
1.5		Composite Sample SM-8-2 collected from 1-2' BGS.					PCBs 8082
2.0							
2.5							
3.0							
3.5		Composite Sample SM-8-4 collected from 3-4' BGS.					PCBs 8082
4.0		Bottom of hole at 4					

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LOG OF TEST PIT SM-09

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 97.3

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0							PCBs 8082
1.5		Composite Sample SM-9-2 collected from 1-2' BGS.					
2.0		Orange fine SAND and SILT, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
2.5							
3.0		Dark brown SAND, well graded, medium dense, dry. No visual/olfactory indicators.					PCBs 8082
3.5		Orange fine SAND and SILT, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators. Composite Sample SM-9-4 collected from 2.8-4' BGS.					
4.0		Bottom of hole at 4					

LOG OF TEST PIT SM-10

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 97.3

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0		Composite Sample SM-10-2 collected from 1-2' BGS.					PCBs 8082
1.5							
2.0		SAA, two 3' pipe segments and one 2' pipe segment found approximately 1-4' BGS. No staining, no visual/olfactory indicators.					
2.5							
3.0							PCBs 8082
3.5		Composite Sample SM-10-4 collected from 3-4' BGS.					
4.0		Bottom of hole at 4					

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LOG OF TEST PIT SM-11

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 97.4

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, trace gravel, trace cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0							
1.5		Composite Sample SM-11-2 collected from 1-2' BGS.					PCBs 8082
2.0							
2.5		Yellow- brown fine to medium SAND some gravel, some cobbles, well graded, medium dense, dry. No staining, no visual/olfactory indicators.					
3.0							
3.5		Composite Sample SM-11-4 collected from 3-4' BGS.					PCBs 8082
4.0		Bottom of hole at 4					

LOG OF TEST PIT SM-12

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 97.2

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry/slightly moist at 4' BGS. No visual/olfactory indicators.					
1.0							
1.5		Composite Sample SM-12-2 collected from 1-2' BGS.					PCBs 8082
2.0							
2.5							
3.0							
3.5		Composite Sample SM-12-4 collected from 3-4' BGS.					PCBs 8082
4.0		Bottom of hole at 4					

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LOG OF TEST PIT SM-13

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 96.9

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, trace boulders, well graded, medium dense, dry/slightly moist at 4' BGS. No visual/olfactory indicators.					
1.0							PCBs 8082
1.5		Composite Sample SM-13-2 collected from 1-2' BGS.					
2.0							
2.5							
3.0							PCBs 8082
3.5		Composite Sample SM-13-4 collected from 3-4' BGS.					
4.0		Bottom of hole at 4					

LOG OF TEST PIT SM-14

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 96.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, trace boulders, well graded, medium dense, dry/slightly moist at 4' BGS. No visual/olfactory indicators.					
1.0							PCBs 8082
1.5		Composite Sample SM-14-2 collected from 1-2' BGS.					
2.0							
2.5							
3.0							PCBs 8082
3.5		Composite Sample SM-14-4 collected from 3-4' BGS.					
4.0		Bottom of hole at 4					

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LOG OF TEST PIT SM-15

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 96.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, trace boulders, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0							PCBs 8082
1.5		Composite Sample SM-15-2 collected from 1-2' BGS.					
2.0							
2.5							
3.0		SAA, orange/yellow-brown with dark brown mottling.					PCBs 8082
3.5		Yellow-brown fine to medium SAND some gravel, some cobbles, trace boulders, well graded, medium dense, dry. No visual/olfactory indicators.					
4.0		Composite Sample SM-15-4 collected from 3-4' BGS.					
4.5		Bottom of hole at 4					

LOG OF TEST PIT SM-16

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 96.9

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry/slightly moist at 4'. No visual/olfactory indicators.					
1.0							PCBs 8082
1.5		Composite Sample SM-16-2 collected from 1-2' BGS.					
2.0							
2.5							
3.0							PCBs 8082
3.5		Composite Sample SM-16-4 collected from 3-4' BGS.					
4.0		Bottom of hole at 4					

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LOG OF TEST PIT SM-17

Date Excavated: 11/14/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 96.7

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND, some gravel, some cobbles, well graded, medium dense, dry. No visual/olfactory indicators.					
1.0							PCBs 8082
1.5		Composite Sample SM-17-2 collected from 1-2' BGS.	✋				
2.0							
2.5							
3.0		Dark brown fine SAND and SILT, well graded, dense, dry.					PCBs 8082
3.5		Orange/yellow-brown fine SAND and SILT, some gravel, some cobbles, well graded, dense, slightly moist. No visual/olfactory indicators.	✋				
4.0		Composite Sample SM-17-4 collected from 3-4' BGS.					
4.5		Bottom of hole at 4					

LOG OF TEST PIT SM-24

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 92.0

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5							cPAHs 8270 CSIM
1.0		Yellow-brown coarse SAND and GRAVEL, some cobbles, trace boulders, well graded, medium dense, dry-slightly moist at 3'. No visual/olfactory indicators. Composite Sample SM-24-1.5 collected from 0.5-1.5' BGS.	✋				
1.5							
2.0		Composite Sample SM-24-3 collected from 2-3' BGS.					cPAHs 8270 CSIM
2.5			✋				
3.0		Bottom of hole at 3					

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LOG OF TEST PIT SM-25

Date Excavated: 11/15/11 — Logged by: COC

Equipment: Backhoe — Surface Elevation(ft): 95.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to medium SAND and GRAVEL, some cobbles, trace boulders, well graded, medium dense, dry. No visual/olfactory indicators.					cPAHs 8270 CSIM
		Composite Sample SM-25-1.5 collected from 0.5-1.5' BGS.					
1.0							
1.5		Bottom of hole at 1.5					

LOG OF TEST PIT SM-26

Date Excavated: 11/15/11 — Logged by: COC

Equipment: Backhoe — Surface Elevation(ft): 91.9

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5							cPAHs 8270 CSIM
		Composite Sample SM-26-1.5 collected from 0.5-1.5' BGS.					
1.0		Dark brown medium to coarse SAND and GRAVEL, some cobbles, well graded, medium dense, dry to moist. No visual/olfactory indicators.					
1.5							
2.0							cPAHs 8270 CSIM
2.5		Composite Sample SM-26-3 collected from 2-3' BGS.					
3.0		Bottom of hole at 3					

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LOG OF TEST PIT SM-27

Date Excavated: 11/15/11 | Logged by: COC

Equipment: Backhoe | Surface Elevation(ft): 93.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Yellow-brown fine to coarse SAND and GRAVEL, some cobbles, well graded, medium dense, slightly moist. No visual/olfactory indicators.					cPAHs 8270 CSIM
1.0		Composite Sample SM-27-1.5 collected from 0.5-1.5' BGS.	✋				
1.5		Bottom of hole at 1.5					

LOG OF TEST PIT SM-28

Date Excavated: 11/15/11 | Logged by: COC

Equipment: Backhoe | Surface Elevation(ft): 91.7

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Composite Sample SM-28-1.5 collected from 0.5-1.5' BGS.					cPAHs 8270 CSIM
1.0		Yellow-brown medium to coarse SAND and GRAVEL, some cobbles, trace boulders, well graded, loose, moist, standing water from 35-36". No visual/olfactory indicators.	✋				
1.5							
2.0							cPAHs 8270 CSIM
2.5		Composite Sample SM-28-3 collected from 2-3' BGS.	✋				
3.0		Bottom of hole at 3					

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LOG OF TEST PIT SM-29

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 93.7

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Dark yellow-brown coarse to medium SAND and GRAVEL, trace cobbles, well graded, loose, moist. No visual/olfactory indicators. Composite Sample SM-29-1.5 collected from 0.5-1.5' BGS.					cPAHs 8270 CSIM
1.0							
1.5		Bottom of hole at 1.5					

LOG OF TEST PIT SM-30

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 91.8

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5							cPAHs 8270 CSIM
1.0		Dark yellow-brown fine to coarse SAND and GRAVEL, some cobbles, well graded, medium dense, moist. No visual/olfactory indicators.					
1.5		Composite Sample SM-30-1.5 collected from 0.5-1.5' BGS.					
2.0		Yellow-grey fine to coarse SAND and GRAVEL, some cobbles, well graded, medium dense to dense, moist. No visual/olfactory indicators. Composite Sample SM-30-3 collected from 2-3' BGS.					cPAHs 8270 CSIM
2.5							
3.0		Bottom of hole at 3					

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LOG OF TEST PIT SM-31

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 93.9

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Dark yellow-brown fine to coarse SAND and GRAVEL, some cobbles, well graded, medium dense, moist. No visual/olfactory indicators.					cPAHs 8270 CSIM
1.0		Composite Sample SM-31-1.5 collected from 0.5-1.5' BGS.					
1.5		Bottom of hole at 1.5					

LOG OF TEST PIT SM-32

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 92.0

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Dark yellow-brown fine to coarse SAND and GRAVEL with cobbles, some boulders, well graded, medium dense, moist, standing water from 35-36". No visual/olfactory indicators.					cPAHs 8270 CSIM
1.0		Composite Sample SM-32-1.5 collected from 0.5-1.5' BGS.					
1.5							
2.0		Composite Sample SM-32-3 collected from 2-3' BGS.					cPAHs 8270 CSIM
2.5							
3.0		Bottom of hole at 3					

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LOG OF TEST PIT SM-33

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 91.9

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Composite Sample SM-33-1.5 collected from 0.5-1.5' BGS.					cPAHs 8270 CSIM
1.0		Dark yellow GRAVEL with coarse sand and cobbles, well graded, medium dense to loose, moist to wet, standing water from 32-36". No visual/olfactory indicators.	✋				
1.5							
2.0							cPAHs 8270 CSIM
2.5		Composite Sample SM-33-3 collected from 2-3' BGS.	✋				
3.0		Bottom of hole at 3					

LOG OF TEST PIT SM-34

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 91.9

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Composite Sample SM-34-1.5 collected from 0.5-1.5' BGS.					cPAHs 8270 CSIM
1.0		Grey-yellow fine to coarse SAND with gravel and cobbles, well graded, dense, moist. No visual/olfactory indicators.	✋				
1.5							
2.0		Composite Sample SM-34-3 collected from 2-3' BGS.					cPAHs 8270 CSIM
2.5			✋				
3.0		Bottom of hole at 3					

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LOG OF TEST PIT SM-35

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 92.1

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5							cPAHs 8270 CSIM
1.0		Dark yellow-brown fine to coarse SAND with gravel, some cobbles, well graded, medium dense, moist. No visual/olfactory indicators.					
1.5		Composite Sample SM-35-1.5 collected from 0.5-1.5' BGS.					
		Dark yellow-brown GRAVEL with fine to coarse sand, well graded, medium dense, wet, standing water from 32-36". No visual/olfactory indicators.					
2.0							cPAHs 8270 CSIM
2.5		Composite Sample SM-35-3 collected from 2-3' BGS.					
3.0		Bottom of hole at 3					

LOG OF TEST PIT SM-36

Date Excavated: 11/15/11 Logged by: COC

Equipment: Backhoe Surface Elevation(ft): 92.2

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5							cPAHs 8270 CSIM
1.0		Yellow-grey fine to coarse SAND and GRAVEL with cobbles, well graded, medium dense, moist. No visual/olfactory indicators.					
1.5		Composite Sample SM-36-1.5 collected from 0.5-1.5' BGS.					
2.0		Yellow-grey GRAVEL with fine to coarse sand and cobbles, trace boulders, well graded, medium dense, wet. No visual/olfactory indicators.					cPAHs 8270 CSIM
2.5		Composite Sample SM-36-3 collected from 2-3' BGS.					
3.0		Bottom of hole at 3					

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LOG OF TEST PIT SM-37

Date Excavated: 12/19/11 | Logged by: COC

Equipment: Backhoe | Surface Elevation(ft): NA

DEPTH (feet)	GRAPHIC LOG	MATERIAL DESCRIPTION	SAMPLE	PID (ppm)	MOISTURE (%)	DRY UNIT WT. (pcf)	LAB TESTS
		Organic layer					
0.5		Brown-orange fine to medium SAND, some gravel and boulders, well graded, loose, dry. No visual/olfactory indicators.					cPAHs 8270 CSIM
1.0		Composite Sample SM-37-1.5 collected from 0.5-1.5' BGS.					
1.5		Brown medium SAND, some gravel and boulders, well graded, loose, dry. No visual/olfactory indicators.					
2.0							cPAHs 8270 CSIM
		Composite Sample SM-37-3 collected from 2-3' BGS.					
2.5							
3.0		Bottom of hole at 3					

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LOG OF: SM-18

Project Number: **117-3008070**

Client:	**W.R. Grace**	Drilling Company:	**Major Environmental/Maher Services**
Project:	**Wells G & H**	Driller:	**Harry Huntoon**
Location:	**W.R. Grace Woburn, MA**	Boring Method:	**Mini-Sonic, water-cooled outer barrel**
North: **546772.600**	East: **701246.040**	Logged By:	**COC**
Total Depth **8.0** / Elev GS: **97.3**	Datum: **NGVD29**	Completion Date:	**November 29, 2011**

Sample Type/No.	Blow Counts	Recovery	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	Remarks
			Light brown, SAND with some silt, trace gravel, well graded loose, wet.	0		
					0.8	
					0.8	
		38		2		
					1.1	
					1.3	
				4		Temp: 55°F
					1.1	
SM-18-6						Sampled from area of highest headspace PID, 5-5.5 feet BGS; no visual/olfactory indicators; Temp: 55°F
		38		6		
SM-18-8			Grey SAND, some silt with some gravel, well graded, dense, wet.		2.3	Sampled from area of highest headspace PID, 7-7.3 feet BGS; no visual/olfactory indicators; Temp: 55°F
			Boring terminated at 8 ft	8		

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LOG OF: **SM-19**

Project Number: **117-3008070**

Client:	**W.R. Grace**	Drilling Company:	**Major Environmental/Maher Services**
Project:	**Wells G & H**	Driller:	**Harry Huntoon**
Location:	**W.R. Grace Woburn, MA**	Boring Method:	**Mini-Sonic, water-cooled outer barrel**
North: **546777.270**	East: **701254.930**	Logged By:	**COC**
Total Depth **8.0** / Elev GS: **96.9**	Datum: **NGVD29**	Completion Date:	**November 29, 2011**

Sample Type/No.	Blow Counts	Recovery	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	Remarks
			Light yellow-brown fine SAND, some silt, trace coarse gravel, well graded, loose to medium dense, dry.	0		
					0.8	Temp: 55°F
		46		2		
					0.8	Temp: 55°F
			SAA, wet from drilling.	4		
			Grey SILT and fine SAND, some coarse to fine gravel, well graded, medium dense, wet from drilling.		0.8	
SM-19-6		46		6	2.4	Sampled from area of highest headspace PID, 5.7-6 feet BGS; no visual/olfactory indicators; Temp: 55°F.
SM-19-8			Yellow-brown fine to coarse SAND and GRAVEL, well graded, medium dense, wet from drilling.		7.5	Sampled from area of highest headspace PID, 7-7.3 feet BGS; no visual/olfactory indicators; Temp: 55°F.
			Boring terminated at 8 ft	8	2.2	

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LOG OF: SM-20

Project Number: **117-3008070**

Client:	**W.R. Grace**	Drilling Company:	**Major Environmental/Maher Services**
Project:	**Wells G & H**	Driller:	**Harry Huntoon**
Location:	**W.R. Grace Woburn, MA**	Boring Method:	**Mini-Sonic, water-cooled outer barrel**
North: **546774.010**	East: **701255.690**	Logged By:	**COC**
Total Depth **8.0** Elev GS: **97.2**	Datum: **NGVD29**	Completion Date:	**November 29, 2011**

Sample Type/No.	Blow Counts	Recovery	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	Remarks
			Yellow-brown fine to coarse SAND and GRAVEL, some silt, well graded, loose, wet.	0		
					0.6	Temp: 55°F
		32	Layer of dark brown fine to coarse SAND and GRAVEL, some silt, well graded, loose, wet.	2		
					0.6	Temp: 55°F
				4		
					0.0	Temp: 55°F
SM-20-6		48	Grey SILT, some fine sand and gravel, well graded, medium dense, wet.	6	0.1	Sampled from area of highest headspace PID, 5.7-6 feet BGS; no visual/olfactory indicators; Temp: 55°F
SM-20-8			Yellow-brown fine to coarse SAND and GRAVEL, well graded, medium dense, wet.		6.3	
			Boring terminated at 8 ft	8	0.9	Sampled from area of highest headspace PID, 7-7.3 feet BGS; no visual/olfactory indicators; Temp: 55°F

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LOG OF: SM_21

Project Number: **117-3008070**

Client:	**W.R. Grace**	Drilling Company:	**Major Environmental/Maher Services**
Project:	**Wells G & H**	Driller:	**Harry Huntoon**
Location:	**W.R. Grace Woburn, MA**	Boring Method:	**Mini-Sonic, water-cooled outer barrel**
North: **546770.960**	East: **701256.150**	Logged By:	**COC**
Total Depth **8.0** Elev GS: **97.2**	Datum: **NGVD29**	Completion Date:	**November 29, 2011**

Sample Type/No.	Blow Counts	Recovery	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	Remarks
			Pavement	0		
			Yellow-brown fine to coarse SAND and GRAVEL, well graded, loose, moist from drilling.			Temp: 60°F
		40		2	0.0	
			Grey SILT and fine SAND, some fine to coarse gravel, well graded, dense, wet from drilling			Temp: 60°F
			No recovery due to rock stuck in drill bit. Shifted rig west one foot and re-drilled.	4	15.5	
			Yellow-brown fine to coarse SAND and GRAVEL, well graded, medium dense, moist from drilling.		0.0	
SM-21-6						Composite of top 1/3 of interval 5-5.3 feet BGS; no visual/olfactory indicators; Temp: 55°F.
		48		6	0.1	
			Grey SILT and fine SAND, some fine to coarse gravel, well graded, medium dense to dense, moist/wet from drilling.		0.2	Temp: 59°F
SM-21-8						Sampled from area of highest headspace PID, 7.7-8 feet BGS; no visual/olfactory indicators; Temp: 59°F.
			Boring terminated at 8 ft	8	24.6	

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Tetra Tech GEO
1 Monarch Drive, Suite 101
Littleton, MA 01460
Telephone: (978) 952-0120
Fax: (978) 952-0122

LOG OF: SM-22

Project Number: **117-3008070**

Client:	**W.R. Grace**	Drilling Company:	**Major Environmental/Maher Services**
Project:	**Wells G & H**	Driller:	**Harry Huntoon**
Location:	**W.R. Grace Woburn, MA**	Boring Method:	**Mini-Sonic, water-cooled outer barrel**
North: **546776.490**	East: **701265.690**	Logged By:	**COC**
Total Depth **8.0** Elev GS: **97.2**	Datum: **NGVD29**	Completion Date:	**November 29, 2011**

Sample Type/No.	Blow Counts	Recovery	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	Remarks
			Yellow-brown fine to coarse SAND and GRAVEL, some silt, well graded, loose to medium dense, wet from drilling	0		
					0.0	Temp: 55°F
		38		2		
					0.0	Temp: 55°F
				4		
			Grey SILT, some fine sand and gravel, well graded, medium dense to dense, moist		9.5	
SM-22-6		48	Yellow-brown fine to coarse SAND and GRAVEL, well graded, dense to medium dense, moist	6	62.3	Sampled from area of highest headspace PID, 5.7-6 feet BGS; no visual/olfactory indicators; Temp: 55°F.
SM-22-8					2.1	Sampled from area of highest headspace PID, 7-7.3 feet BGS; no visual/olfactory indicators; Temp: 60°F.
			Boring terminated at 8 ft	8	0.9	

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LOG OF: SM-23

Project Number: **117-3008070**

Client:	**W.R. Grace**			Drilling Company:	**Major Environmental/Maher Services**
Project:	**Wells G & H**			Driller:	**Harry Huntoon**
Location:	**W.R. Grace Woburn, MA**			Boring Method:	**Mini-Sonic, water-cooled outer barrel**
North:	**546778.610**	East:	**701275.650**	Logged By:	**COC**
Total Depth	**8.0** Elev GS: **97.2**	Datum:	**NGVD29**	Completion Date:	**November 29, 2011**

Sample Type/No.	Blow Counts	Recovery	SOIL DESCRIPTION	Depth (feet)	PID (ppm)	Remarks
			Yellow-brown fine to coarse SAND and GRAVEL, some silt, well graded, loose, wet from drilling.	0		
					3.1	
		26		2	3.9	Temp: 55°F
			Yellow-brown fine to coarse SAND, some gravel, trace silt, well graded, medium dense, wet from drilling.	4		
SM-23-6					0.0	Composite sample from 5-5.3 feet BGS; no visual/olfactory indicators; Temp: 55°F.
		38		6	0.0	
SM-23-8					0.0	Composite sample from 7-7.3 feet BGS due to recovery; no visual/olfactory indicators; Temp: 57°F.
			Boring terminated at 8 ft	8		

APPENDIX C

DECEMBER 11, 2014 COMFORT LETTER

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 1
5 Post Office Square, Suite 100
Boston, MA 02109-3912

December 11, 2014

Madison Woburn Holding, LLC
Attn.: Denis P. Dowdle
20 Park Plaza
Suite 433
Boston MA 02116

Re: 369 Washington Street, Woburn, Massachusetts
Wells G&H Superfund Site

Dear Mr. Dowdle:

I am writing in response to your request for a comfort/status letter regarding the Superfund Site referenced above, which includes 369 Washington Street, in Woburn, Massachusetts (the "Property"). My response is based upon the facts presently known to the United States Environmental Protection Agency ("EPA").

Under the Comprehensive Environmental Response, Compensation and Liability Act ("CERCLA"), commonly referred to as Superfund, EPA's mission is to protect human health and the environment from the risks posed by contaminated or potentially contaminated lands. In doing so, it is an Agency priority to return lands to productive reuse.

As you know, the Property is located within the Wells G&H Superfund Site (the "Site") and subject to the requirements of a Consent Decree ("Consent Decree"), pursuant to *United States v. Wildwood Conservation Corp., et al.*, entered by the United States District Court for the District of Massachusetts in Civil Action No. 91-11807 MA, between the United States and the settling parties named therein, including W.R. Grace & Co. ("W.R. Grace"). A copy of the Consent Decree is enclosed. The Consent Decree provides for the implementation by Settling Defendants of the remedial action selected by EPA in the September 14, 1989 Record of Decision ("ROD") and the April 25, 1991 Explanation of Significant Difference (ESD) for the first operable unit of the Site, consisting of source control and management of migration from five source areas, of which the Property is one.

The Consent Decree specifies that any change in ownership status of a Defendant, including any transfer of property located within the Site, shall in no way alter such Defendant's responsibility under the Consent Decree (see Consent Decree, Paragraph 2). The Consent Decree requires W.R. Grace to notify EPA in writing thirty days before transferring ownership of the Property and to provide EPA with a copy of the sale agreement (see Consent Decree, Paragraph 7). The

Consent Decree also requires W.R. Grace to not adversely affect the integrity of any treatment or monitoring system installed (see Consent Decree, Paragraph 7). The Consent Decree further specifies that in the event of a conveyance of an interest in property included in the Site, "…the Settling Defendants' obligations under this Consent Decree shall continue to be met by the Settling Defendant and, subject to approval by the United States, in consultation with the Commonwealth, by the grantee" (see Consent Decree Paragraph 7.c.). In addition, W.R. Grace must obtain the potential purchaser's agreement to comply with the access provision of Consent Decree Section X, and Successors in Title (as defined in Paragraph 7) shall agree to comply with the provision of access, which obligation runs with the land.

History and Status of the Site

Historically, W.R. Grace purchased the Property in 1960 and subsequently constructed the main office/manufacturing building, where food wrapping/packaging equipment was fabricated until operations ceased in approximately 1988. During this time, Wells G and H were installed in 1964 and 1967 to supplement the water supply of the City of Woburn. Groundwater from the wells was tested in 1979 and found to be contaminated with volatile organic compounds (VOCs). The wells were shut down later that same year. The Property, along with four other separate properties, was identified in subsequent investigations as a contributing source of the groundwater contamination detected at the Site.

On September 14, 1989, EPA issued the ROD selecting a comprehensive remedial action for the first operable unit ("OU-1") of the Site consisting of source control and management of migration from five source areas, of which the Property is one. The ROD addresses, among other things: excavation and incineration of contaminated soil; treatment of additional contaminated soil in place; and pumping and treating contaminated groundwater. Under the ROD for OU-1, EPA determined that groundwater recovery and treatment was necessary at the Property.

In 1991, W.R. Grace, along with other potentially responsible parties, entered into the Consent Decree with EPA and DEP to, among other things, implement the remedy selected in the ROD, as later modified by the ESD. W.R. Grace has constructed and currently continues to operate the Monitoring Wells and the Recovery System at the Property. In addition, W.R. Grace removed contaminated soil discovered on the Property in 2012, as documented in the "Soil Response Action Completion Report, Revision 1, W.R. Grace and Co., 369 Washington Street, Woburn, Massachusetts," dated July 3, 2013.

Implementation of the remedy selected in the ROD will require continued operation of the Monitoring Wells and Recovery System. Pursuant to Sections VI and VIII of the Consent Decree, W.R. Grace is responsible, among other things, for the continued operation and maintenance of the Monitoring Wells and the Recovery System at the Property. Continued implementation of the remedy must include uninterrupted operation of the on-going groundwater recovery and treatment system (including but not limited to all recovery wells, monitoring wells, system utilities and piping, treatment, etc.), pursuant to W.R. Grace's obligations under Sections VI and VIII of the Consent Decree.

CERCLA's Bona Fide Prospective Purchaser Liability Protection

In January 2002, Congress amended CERCLA to include liability limitations for landowners that acquire contaminated property after the effective date of the amendments (January 11, 2002) if those landowners qualify as "bona fide prospective purchasers" ("BFPP"). To meet the statutory criteria for a BFPP, a landowner must satisfy certain threshold criteria and continuing obligations. See Sections 101(40) and 107(r) of CERCLA, 42 U.S.C. Sections 9601(40) and 9607(r). Among other threshold criteria which are not included in full herein, a BFPP must establish that (i) all disposal of hazardous substances at the facility occurred before the purchaser acquired the facility. (ii); the purchaser performed "all appropriate inquiry" into the previous ownership and uses of the property before acquisition; and (iii) the purchaser is not potentially liable or affiliated with any other person who is potentially liable for response costs.

In addition to threshold criteria, a landowner must meet certain continuing obligations in order to qualify as a BFPP. One continuing obligation requires a landowner to provide full cooperation assistance, and access to persons that are authorized to conduct response actions at the Site. In addition, a BFPP must establish, among other things, that (i) it is in compliance with any land use restrictions established or relied on in connection with the cleanup; and (ii) it does not impede the effectiveness or integrity of any institutional control employed in connection with the cleanup. As provided in EPA's Interim Guidance Regarding Criteria Landowners Must Meet in Order to Qualify for Bona Fide Prospective Purchaser, Continuous Property Owner, or Innocent Landowner Limitations on CERCLA Liability, dated March 6, 2003, landowners must "comply with land use restrictions and implement institutional controls even if the restrictions or institutional controls were not in place at the time the person purchased the property."

Another continuing obligation required to qualify as a BFPP is taking "reasonable steps to stop any continuing release; prevent any threatened future release; and prevent or limit human, environmental, or natural resource exposure to any previously released hazardous substance." Section 101(40)(D) of CERCLA, 42 U.S.C. Section 9601(40). The actions that you must take, as the owner of the Property, to satisfy the "reasonable steps" criterion, include, but are not limited to:

- providing access to the Property at all reasonable times and cooperating with EPA for the purpose of conducting response actions;
- notifying all contractors, subcontractors, lessees and any other parties operating at the Property of this letter, and ensuring that these parties satisfy the requirements set forth in this letter;
- protecting and maintaining all aspects of the groundwater recovery and treatment system during redevelopment activities, and replacing, at your sole expense, any aspect of the system on the Property damaged during construction or operations of the proposed redevelopment, after notifying EPA and W.R. Grace of the damage and receiving written EPA approval for the equivalent replacement;

- providing EPA and W.R. Grace with copies of the final redevelopment design plans before proceeding with construction, and with as-built drawings at the completion of construction;
- making sure that contact with groundwater during redevelopment, including by workers or tenants, only occurs under property-specific health and safety plans until the remedy is complete (as non-ingestion uses of groundwater, such as dermal contact during industrial groundwater usage or direct contact during excavation, have not been fully evaluated);
- implementing (other) appropriate health and safety plans;
- preparing an acceptable soil and groundwater management plan for monitoring of potentially contaminated soils and groundwater during intrusive redevelopment activities and notifying EPA and W.R. Grace if encountered;
- incorporating vapor intrusion mitigation measures into any future buildings on the Property (as the maximum detected shallow groundwater concentration for trichloroethylene (TCE) currently exceeds its Vapor Intrusion Screening Level for both commercial and residential land uses);[1]
- providing EPA and W.R. Grace with copies of any environmental data collected at the Property;
- providing EPA and W.R. Grace with weekly progress summaries during construction, including the identification of anticipated areas of intrusive activities on the Property;
- cooperating with EPA's field oversight activities; and
- refraining from using the Property in any manner that would interfere with or adversely affect the implementation, integrity or protectiveness of any response actions performed at the Site.

In addition, you must agree to impose land and/or water use restrictions on the Property if EPA determines that such restrictions are needed to implement the response actions and/or ensure the integrity and protectiveness of the cleanup.

Any reasonable steps suggested by the EPA are based on the nature and extent of contamination known to EPA at this time and are provided solely for informational purposes. If additional information regarding the nature and extent of hazardous substance contamination at the Site and/or Property becomes available, additional actions may be necessary to satisfy the reasonable steps criterion. You should ensure that you are aware of the condition of the Property so that you are able to take reasonable steps with respect to any hazardous substance contamination. In particular, if new areas of contamination are identified, you should ensure that reasonable steps are undertaken.

Please note that the BFPP provision has a number of conditions in addition to those requiring the property owner to take reasonable steps. Taking reasonable steps and many of the other conditions are continuing obligations of the BFPP. You will need to assess whether you satisfy each of the statutory conditions for the BFPP provisions and continue to meet the applicable conditions.

[1] See the US EPA Five Year Review Report for the Wells G&H Superfund Site, September 29, 2014.

Nature of this Comfort/Status Letter

EPA generally issues comfort/status letters to facilitate the cleanup and reuse of contaminated or formerly contaminated properties. This comfort/status letter is intended to help you make informed decisions by providing you with the information that the EPA has about the Site and by identifying any statutory protections, enforcement discretion guidance, resources and tools that may be potentially available.

This letter is not otherwise intended to limit or affect EPA's authority under CERCLA or any other law or provide a release from CERCLA liability. EPA encourages you to consult with legal counsel and the appropriate state, tribal or local environmental protection agency before taking any action to acquire, clean up, or redevelop potentially contaminated property. It is your responsibility to ensure that the proposed use of the Property complies with any federal, state, local, and/or tribal laws or requirements that may apply. EPA recommends that you consult with your own environmental professional to obtain advice on the compatibility of the proposed reuse.

EPA appreciates the cooperation of Madison Properties. We hope this information is useful to you. If you have any questions, or wish to discuss this letter, please feel free to call Cindy Lewis, Senior Enforcement Counsel, at lewis.cindy@epa.gov, or (617) 918-1889.

Sincerely,

James T. Owen, III
Director, Office of Site Remediation and Restoration

Enclosed: Consent Decree for the Wells G&H Superfund Site.

cc: Craig Campbell
Bob Cianciarulo, EPA
Cindy Lewis, EPA
Joseph LeMay, EPA
Craig Boehr, EPA HQ
John Beling, MassDEP
Jay Naparstek, MassDEP
Jennifer McWeeney, MassDEP
Joe Coyne, MassDEP
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